ENGINEERING NEWS-RECORD

JUNE 14, 1945

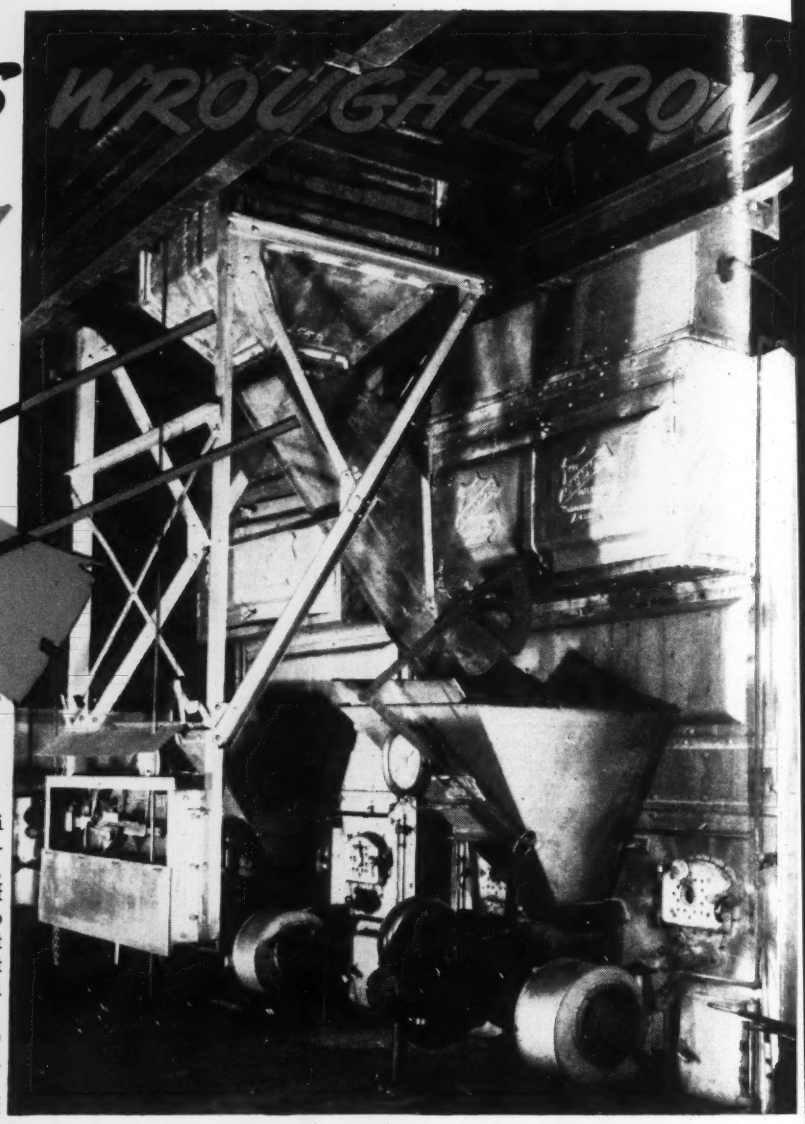
In This Issue

HOW MUCH CONSTRUCTION
HOW SOON?

REPAIR OF EUROPE'S
WAR-WRECKED HARBORS

Movable bridge problem at Los Angeles was solved with two concrete pontoon units designed to slide back under approach ramps on either side.

BYERS WROUGHT IRON installed Here to EXTEND HOPPER and CHUTE LIFE



This Coal Larry at the Cincinnati Times Star power plant was installed when the building was built. The hopper and chute—made of low first-cost materials—started to fail four years ago, but were kept in service until late 1944 by a lot of patching and repairing. Then the engineer, Mr. Charles Knorr, took steps to end the excessive maintenance. Following time-tried and time-proved practice, he installed a new hopper and chute of Byers Wrought Iron.

This same sound principle is followed by engineers in plants all over the country, who have used wrought iron for all varieties of coal handling equipment: coaling stations, bunkers, conveyors, chutes and larries. While abrasion is always a factor in service life, corrosion should always be anticipated and forestalled. The type of corrosion is similar to that occurring in smoke stacks, and is due to moisture leaching sulfur compounds from the fuel. The severity of attack is aggravated when operation is intermittent, and in such installations the protection afforded by wrought iron is doubly important.

Anyone familiar with the service conditions involved, and with the character of wrought iron, can readily understand why the material lasts longer. The tiny glass-like silicate slag fibers that are threaded through the body of high purity iron act almost like a picket fence, to halt and disperse the corrosive action. This discourages the pitting and penetration that generally causes ordinary materials to fail. Furthermore, the fibers help to anchor the initial protective film more firmly, and this film shields the underlying metal just as a scab protects a wound.

Some of the many installations of wrought iron in coal handling equipment are illustrated and described in our bulletin, "Wrought Iron for Flue Gas Conductors and Coal Handling Equipment." If you would like to review the subject, just write for a complimentary copy of this bulletin.

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WALDO G. BOWMAN, *Editor* ALBERT E. PAXTON, *Publisher*

Vol. 134 JUNE 14, 1945 No. 24

COMING NEXT

• In the June 28 issue Arthur J. Boase, manager, Structural Bureau, Portland Cement Association, contributes an analytical study of Brazilian and United States building codes, in which he points out specific differences and their effect upon design. Mr. Boase re-designed a 16-story apartment recently erected in Rio de Janeiro using the American Concrete Institute building regulations in order to present a true comparison of the two codes and their ultimate effect upon construction.

• Carbon monoxide concentrations represent hazards to public safety even in a vehicular tunnel as short as that required by a highway grade separation. How structural engineers can easily and quickly determine the ventilation requirements of such a structure will be outlined in an article scheduled for the June 28 issue.

• Carefully planned construction sequence and reusable forms invariably pay dividends in concrete work. Special designed steel forms expedited the pouring of 720 reinforced concrete washwater troughs during construction of a Chicago filtration plant. Other labor saving devices included roller-mounted concreting platforms and a special lifting frame for setting forms, operated by an overhead joist traveling along temporary trolley beams. These and other important features of major interest will be described in the June 28 issue.

LOOKING AHEAD

• Shortly before the great Rhine offensive began, which ultimately doomed Nazi Germany to defeat, the United States Army Engineers had rehabilitated 7,000 miles of European railroads to provide the Allied armies with major supply routes to the Western Front. How well these routes functioned is now evident from the successful results obtained. The engineering and construction task involved in restoring so many miles of railroad service was largely one of bridging and reconstruction of marshalling and transfer yards. The epic story of this achievement will be told by Waldo Bowman, editor of *ENR* in two articles scheduled to appear in the July 12 and July 26 issues.

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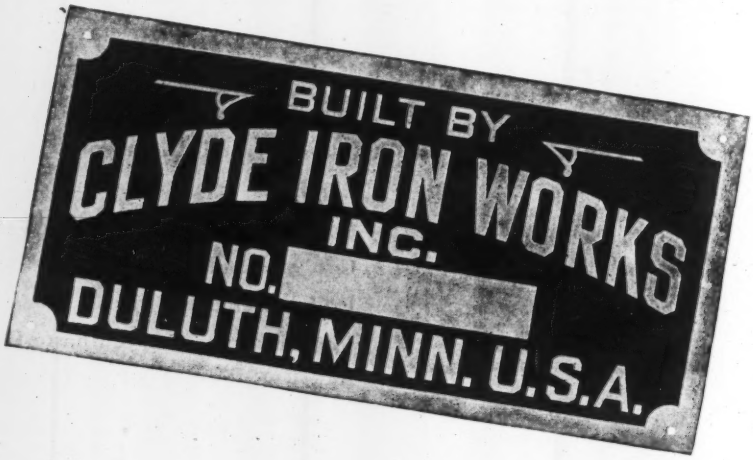

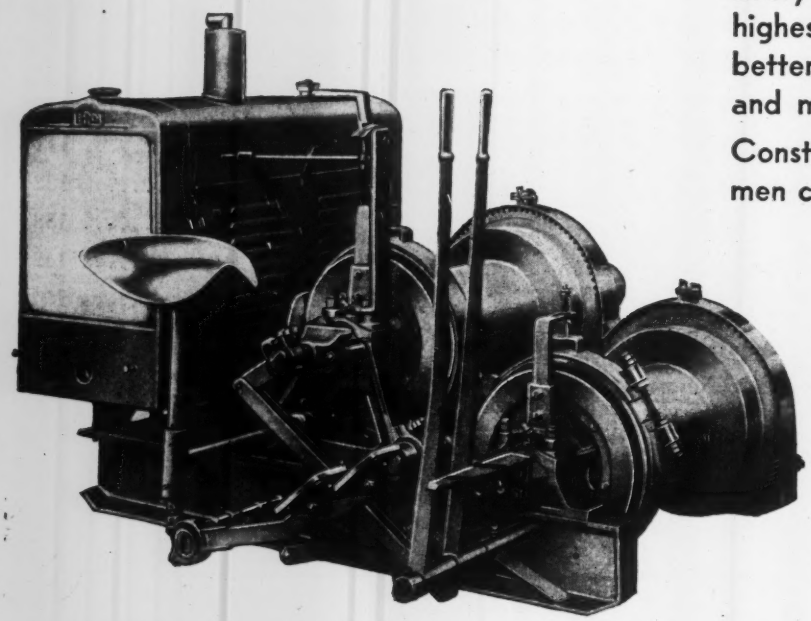

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New Construction in May

CIVIL ENGINEERING construction volume in continental United States for May totals $164,955,000, an average of $32,991,000 for each of the five weeks of the month. This weekly average volume is 6 percent below that reported for the four weeks of April 1945, and 5 percent under the average for the four weeks of May 1944.

Public construction, on the weekly average basis, is 9 percent higher than in the preceding month, and 10 percent above the 1944 month. The gain in public volume, however, is offset by the decline in private construction which is down 39 percent compared with last month, and off 38 percent compared with last year.

Federal volume for May is 4 percent greater than a month ago and 9 percent higher than a year ago. State and municipal construction is 28 and 12 percent higher, respectively, than last month and the corresponding 1944 month.

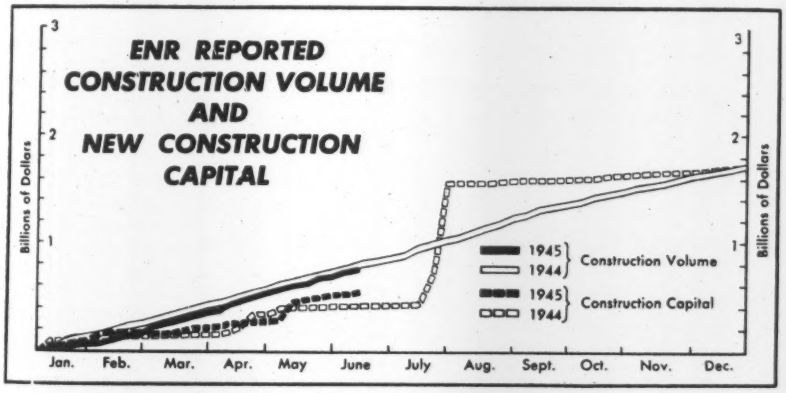
May volume brings the 1945 construction total to $685,541,000 for the five-month period. This is an 11 percent decrease from the $734,019,000 for the five months of 1944 when adjusted for the difference in the number of weeks reported—21 in 1944, 22 in 1945. Private construction for the period, $191,141,000, tops last year by 8 percent, but public construction, $494,400,000, is down 16 percent. The decrease in public is due to the 22 percent drop in federal work, from $487,358,000 last year to $398,989,000 in 1945. State and municipal volume, $95,411,000, exceeds a year ago by 17 percent.

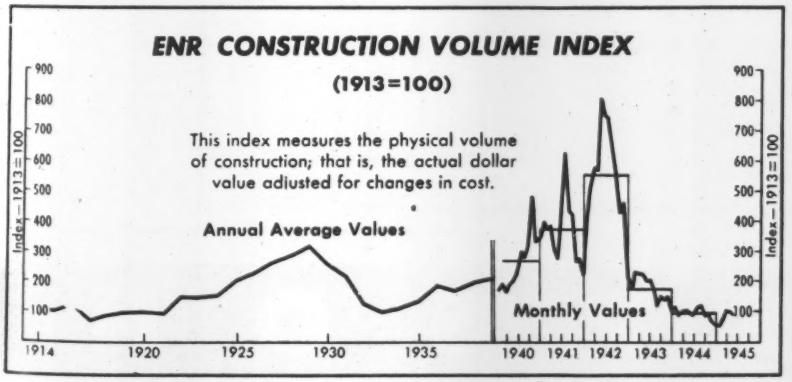
New Capital

New capital for construction purposes for the five weeks of May totals $233,017,000, a 207 percent increase over the $60,914,000 for the four-week month in 1944. The current month's new financing volume is made up of $32,356,000 in state and municipal bond sales, $26,788,000 in corporate security issues, and $173,873,000 in federal appropriations for federal work.

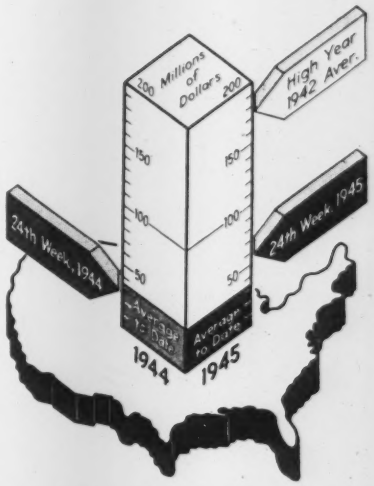
New construction capital for 1945 to date, $511,710,000, is 14 percent greater than in the period last year. Of the five-month 1945 total, $164,988,000 is in state and municipal bond sales, $74,812,000 is in corporate security issues, $20,900,000 in government loans for private and public construction, and $251,010,000 in federal appropriations for military and departmental construction.

(*See Volume Table, page 69*)




ENR CONSTRUCTION VOLUME INDEX
(1913=100)
This index measures the physical volume of construction; that is, the actual dollar value adjusted for changes in cost.
Annual Average Values
Monthly Values
Index—1913=100
1914 1920 1925 1930 1935 1940 1941 1942 1943 1944 1945

CONSTRUCTION ACTIVITY



As Reported This Week to... *Engineering News-Record*

CONTRACT VOLUME

Continental U. S. Only (Thousands of Dollars)

	Week of June 14 1945	Cumulative 1945 (24 wk.)	Cumulative 1944 (24 wk.)
Federal	$34,386	$453,886	$540,577
State & Municipal	5,186	109,692	96,226
Total Public	$39,572	$563,578	$636,803
Total Private	19,644	224,164	192,575
U. S. Total	**$59,216**	**$787,742**	**$829,378**

WHERE CONSTRUCTION ACTIVITY ORIGINATED THIS WEEK

Type of Work	Dollar Volume (Thousands) This Week	Cumulative 1945 (24 wk.)	Cumulative 1944 (24 wk.)
Waterworks	$769	$18,073	$12,162
Sewerage	324	13,141	11,992
Bridges	444	11,807	6,338
Highways	4,002	79,213	85,097
Earthwork, Waterways	910	16,330	30,435
Buildings, Public	5,517	292,602	313,181
Industrial	16,760	156,235	80,746
Commercial	2,182	38,110	86,346
Unclassified	28,308	162,231	203,081

NOTE: Minimum size projects included are: Waterworks and waterways projects, $15,000; other public works, $25,000; industrial buildings, $40,000; other buildings, $150,000.

NEW PRODUCTIVE CAPITAL

	Cumulative 1945 (24 wk.)	Cumulative 1944 (24 wk.)
NON-FEDERAL	$271,879	$190,850
Corporate Securities	76,180	83,139
State and Municipal	174,799	53,931
RFC Loans	20,900	53,780
FEDERAL	$251,010	$245,266
Total Capital	**$522,889**	**$436,116**

ENR INDEX NUMBERS

Index Base = 100		1913	1926
Construction Cost	June '45	308.99	148.53
Building Cost	June '45	239.37	129.40
Volume	May '45	93	41

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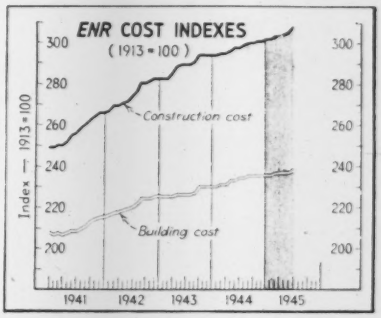
JUNE CONSTRUCTION BUSINESS REPORT

ENR CONSTRUCTION VOLUME AND NEW PRODUCTIVE CAPITAL

(,000 omitted)	May 1944 (4 wk.)	May 1945 (5 wk.)	% Change†	Five Months 1944 (21 wk.)	Five Months 1945 (22 wk.)	% Change†
Total U. S. Construction	$138,857	$164,955	−5.0	$734,019	$685,541	−11.0
Private Construction	42,923	33,498	−38.0	168,912	191,141	+8.0
Public Construction	95,934	131,457	+10.0	565,107	494,400	−16.0
Federal	71,458	97,058	+9.0	487,358	398,989	−22.0
Total New Productive Capital	$60,914	$233,017	+207.0	$426,549	$511,710	+14.0
Private Investment	21,480	59,144	+120.0	127,503	239,800	+80.0
Federal (non-federal work)	.....	.....	.....	53,780	20,900	−63.0
Federal (federal work)	39,434	173,873	+253.0	245,266	251,010	−2.0
ENR Construction Volume Index, 1913 = 100	100	93	−7.0	102*	87*	−15.0

† *Adjusted for difference in number of weeks reported.* * *Five-month average.*



CONSTRUCTION COSTS . . . . WAGE RATES . . . . MATERIAL PRICES

	June 1944	June 1945	% Change	Change May to June 1944 May	1944 June	1944 %	1945 May	1945 June	1945 %
ENR Construction Cost Index, 1913 = 100‡	298.72	308.99	+3.4	298.00	298.72	+0.2	307.43	308.99	+0.5
ENR Building Cost Index, 1913 = 100‡	235.33	239.37	+1.7	234.80	235.33	+0.2	238.46	239.37	+0.4

‡ *Does not reflect increased costs due to overtime, lower labor efficiency, delivery delays, etc.*

ENR 20-CITIES' AVERAGE

Common Labor	$0.877	$0.916	+4.4	$0.874	$0.877	+0.3	$0.909	$0.916	+0.8
Skilled Labor (Av. 3 trades)	1.638	1.661	+1.4	1.632	1.638	+0.4	1.650	1.661	+0.7
Bricklayers	1.736	1.762	+1.5	1.726	1.736	+0.6	1.747	1.762	+0.9
Structural Ironworkers	1.694	1.712	+1.1	1.688	1.694	+0.4	1.705	1.712	+0.4
Carpenters	1.484	1.510	+1.7	1.481	1.484	+0.2	1.498	1.510	+0.8
Cement, per bbl	$2.65	$2.74	+3.4	$2.64	$2.65	+0.4	$2.74	$2.74	0
Reinforcing steel, cwt	2.79	2.79	0	2.79	2.79	0	2.79	2.79	0
Structural steel, base	2.10	2.10	0	2.10	2.10	0	2.10	2.10	0
Sand, per ton	1.23	1.24	+0.8	1.23	1.23	0	1.24	1.24	0
Lumber, Fir, 2x4, per M ft.	54.28	55.87	+2.9	54.07	54.28	+0.4	55.57	55.87	+0.5
Lumber, Pine, 2x4, per M ft.	52.68	53.44	+1.4	52.68	52.68	0	53.44	53.44	0
Common brick, per M	16.41	18.46	+12.5	16.45	16.41	+0.2	18.48	18.46	−0.1
Ready-mixed concrete, c. y.	7.39	7.60	+2.8	7.39	7.39	0	7.57	7.60	+0.4
Struct. clay tile, 3x12x12	79.97	84.75	+6.1	79.64	79.97	+0.4	84.75	84.75	0
Paving asphalt, cars, ton	15.25	15.48	+1.5	15.25	15.25	0	15.48	15.48	0

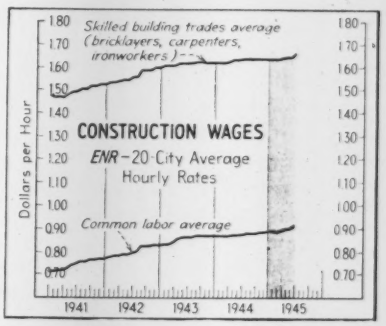
ENR INDEX NUMBERS

Base = 100	Construction Cost 1913	Construction Cost 1926	Building Cost 1913	Building Cost 1926	Volume '13	Volume '26
June, 1945	308.99	148.53	239.37	129.40	.....	.....
May, 1945	307.43	147.78	238.46	128.90	93	41
Apr., 1945	306.43	147.30	238.46	128.90	99	43
Mar., 1945	304.50	146.37	237.85	128.57	103	45
Feb., 1945	303.70	145.99	237.71	128.50	78	34
Jan., 1945	302.50	145.41	236.51	127.85	63	28
Dec., 1944	302.30	145.32	236.51	127.85	66	29
Nov., 1944	301.09	144.73	236.10	127.63	74	33
Oct., 1944	301.05	144.72	236.00	127.57	91	40
Sept., 1944	300.46	144.43	236.00	127.57	82	37
Aug., 1944	300.42	144.41	236.00	127.62	121	53
July, 1944	299.94	144.18	235.55	127.33	114	50
June, 1944	298.72	143.59	235.33	127.21	91	40
May, 1944	298.00	143.25	234.80	126.93	100	44
1944 (Av.)	298.64	143.59	234.73	126.89	96	42
1943 (Av.)	289.95	139.33	228.75	123.66	176	77
1942 (Av.)	276.31	132.82	222.39	120.22	553	243
1941 (Av.)	257.84	123.95	211.46	114.32	375	164

MATERIAL SHIPMENTS . . . . BUILDING PERMITS

	May 1944	May 1945	% Change	Apr. 1945	% Change Apr.-May
Steel (% of operating capacity) A.I.S.I	98.8	94.0	−4.9	94.4	−0.4

	April 1944	April 1945	% Change	Four Months 1944	Four Months 1945	% Change
Fabricated Structural Steel, tons, A.I.S.C	44,495	50,701	+14.0	163,947	210,200	+28.3
Cement, thous. bbl., U. S. B. of M	7,373	7,894	+7.1	23,700	24,329	+2.7
Building Permits, 215 cities, Dun & Bradstreet (,000 omitted)	$44,790	$61,077	+36.4	$194,800	$246,045	+26.3



COST OF LIVING INDEX . . . . CIVIL NON-AGRICULTURAL EMPLOYMENT

	April 1944	April 1945	% Change	Mar. 1945	% Change Mar.-Apr.
Cost of Living Index, N.I.C.B	104.1	105.8	+1.6	105.4	+0.4
Rent (Housing) Index, N.I.C.B	90.8	91.0	+0.2	91.0	0
Total Employment (est.) thous., B.L.S	38,689	37,750	−2.5	38,026	−0.7
Constr. Employment (est.) thous., B.L.S	683	646	−5.3	619	+4.4

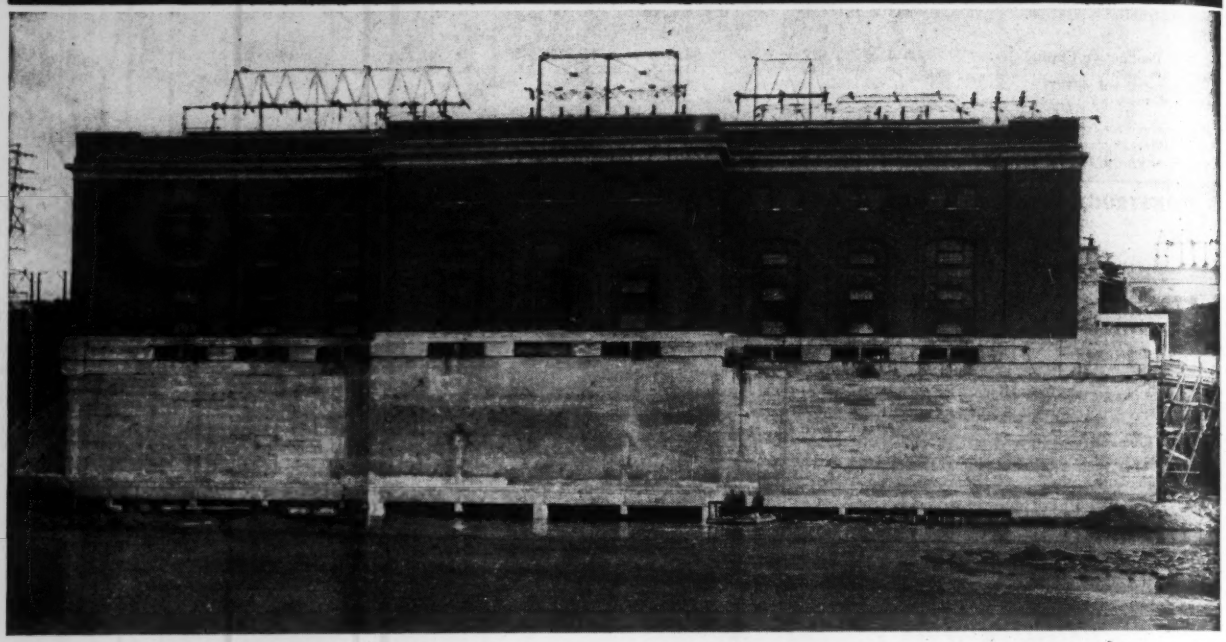
ENGINEERING CONSTRUCTION CONTRACTS — ENGINEERING NEWS-RECORD — MAY, 1945

Engineering News-Record *reports continental U. S. Construction projects of the following minimum costs—waterworks, excavation, drainage and irrigation,* $15,000; *other public works,* $25,000; *industrial buildings,* $40,000; *other buildings,* $150,000

Five weeks—Thousands of Dollars (000 Omitted)

Public Works	New England	Middle Atlantic	South	Middle West	West of Mississippi	Far West	United States May 1945	United States Five Months 1945	United States Five Months 1944	Canada
Waterworks	158	1,152	476	601	1,328	1,556	5,271	17,001	9,613	205
Sewerage	215	250	570	217	199	418	1,869	11,985	9,143	.....
Bridges, public	280	390	682	76	364	271	2,063	7,466	3,385	.....
Earthwork and waterways	171	214	380	186	790	1,044	2,785	14,427	22,348	26
Streets and roads	466	3,402	4,754	6,923	7,764	3,286	26,595	67,251	67,415	162
Buildings, public	3,068	4,220	9,524	5,371	21,322	19,466	62,971	276,657	288,886	3,660
Unclassified, public	929	5,893	8,235	1,362	4,119	9,365	29,903	99,613	164,317	.....
Total public	**5,287**	**15,521**	**24,621**	**14,736**	**35,886**	**35,406**	**131,457**	**494,400**	**565,107**	**4,053**
Federal government (included in above classifications)	4,068	10,130	18,764	6,528	27,596	29,972	97,058	398,989	487,358	.....
Private										
Bridges, private	10	.....	1,000	.....	.....	86	1,096	3,631	1,325	.....
Industrial buildings	944	3,137	6,590	5,487	1,763	1,561	19,482	132,325	70,914	5,895
Commercial buildings	2,720	450	.....	2,400	1,192	1,805	8,567	34,922	78,556	150
Unclassified, private	15	.....	3,085	89	478	686	4,353	20,263	18,117	.....
Total private	**3,689**	**3,587**	**10,675**	**7,976**	**3,433**	**4,138**	**33,498**	**191,141**	**168,912**	**6,045**
Total Engineering Construction:										
May, 1945—5 weeks	**8,976**	**19,108**	**35,296**	**22,712**	**39,319**	**39,544**	**164,955**	.....	.....	**10,098**
April, 1945—4 weeks	5,750	17,433	26,521	31,468	22,226	36,981	140,379	.....	.....	14,737
May, 1944—4 weeks	3,833	23,896	21,522	14,017	17,729	57,860	138,857	.....	.....	9,082
Five Months—1945	**26,906**	**91,767**	**134,743**	**95,044**	**171,357**	**165,724**	.....	**685,541**	.....	**45,083**
Five Months—1944	20,886	112,404	120,847	88,065	109,267	282,550	.....	.....	734,019	32,944

Structural Repairs at Hydro Station Made with Duraplastic Air-Entrained Concrete



Duraplastic air-entrained concrete was used for repairs at hydroelectric station of Western Massachusetts Electric Co. H. A. Moody, Hydraulic Engineer; Concrete furnished by Construction Service Corp., Springfield, Mass.; Daniel O'Connell's Sons, Inc., Holyoke, Mass., contractor.

FREEZING and thawing action during 28 New England winters developed spalling of the turbine scroll cases at a hydroelectric station of Western Massachusetts Electric Co. The engineer states that the marked resistance to scaling of pavement concrete made with Atlas Duraplastic air-entraining cement suggested the answer:

1. Damaged portions of old concrete were removed and replaced by a veneer of Duraplastic air-entrained concrete. Thin sections were gunited, and thick sections were concreted from chutes.

2. New concrete curtain walls were constructed.

Since concrete made with Duraplastic air-entraining cement requires less water for a given slump and permits less sand for a given yield than concrete made with regular cement, the engineer on this job specified a mix with ¾ to 1 gallon less water per sack of cement and 150 lb. less sand per cu. yd. of concrete. He states that—

1. There was practically no segregation in the mix.

2. There was no appreciable water gain on top of the concrete walls after all the concrete had been placed in one continuous operation.

3. When the forms were removed, the surface was free of "honeycomb" spots and sand streaks.

For further information on uses of Duraplastic cement, write to Technical Service Bureau, Universal Atlas Cement Company (United States Steel Corporation Subsidiary), Chrysler Building, New York 17, N. Y.

OFFICES AT: New York, Chicago, Pittsburgh, Cleveland, Philadelphia, Albany, Boston, Des Moines, Minneapolis, Duluth, Waco, St. Louis, Kansas City, Birmingham.

ENR-D-14

ATLAS DURAPLASTIC

TRADE MARK REG. U. A. C. CO.

The Air-Entraining Portland Cement That Makes Concrete More Durable and More Plastic

The Week In Engineering and Construction

ENGINEERING NEWS-RECORD • JUNE 14, 1945 • VOLUME 134 • NUMBER 24

Release of highway funds is asked of Congress

American Road Builders Association asks for adoption of joint resolution of both houses required by the Federal Aid Highway Act of 1944.

Because unemployment is developing in some regions on account of cutbacks in military requirements, the American Road Builders Association has asked Congress to take the steps necessary before funds authorized under the Federal Aid Highway Act of 1944 can be released to the states for construction work. The act provided that the authorized funds were for use in the first fiscal year after the President or the two Houses of Congress had declared the existing war emergency to be terminated, or in the fiscal year after the two houses, by joint resolution, declared that the emergency had been relieved to an extent that would permit some highway work to go ahead. As a new fiscal year begins on July 1, adoption of such a resolution before that date would make possible an early start on some federal-aid work.

Charles M. Upham, engineer-director of the A.R.B.A., has appealed to Rep. J. W. Robinson, chairman of the House Roads Committee, to inaugurate public hearings on such a resolution.

"We do not claim that highway construction without limitation should start now, but we find an unemployment problem in the number of returning service men and the cancelling of war contracts", said Mr. Upham. "This comes at a time when war restrictions and lack of manpower have so restricted maintenance that our highways, streets and alleys will not be capable of serving the increased traffic of the postwar period. The resolution we ask for will both provide jobs and start things moving toward an adequate postwar highway system."

With few exceptions, materials for highway construction are no longer critical, Mr. Upham finds, and no shortage exists for such basic materials as cement, asphalt, tar, crushed stone, sand and gravel. It is claimed that a substantial amount of roadbuilding can be carried on with a negligible amount of steel. While lumber is still critical, it is thought that in most instances contractors can meet the small requirements for form work with used material. Recently the War Production Board has modified its controls over construction machinery, and with further military and manufacturing cutbacks, getting equipment will soon cease to be a problem.

"By starting now," says Mr. Upham, "we can forestall serious unemployment later on, and at the same time meet one of our most pressing national needs, the rehabilitation of our roads and streets."

Funds for three years

The postwar highway act authorized the federal government to grant the states $500,000,000 a year for each of three fiscal years following the war. The sum of $100,000,000 was made immediately available to the states for surveys and plans so that the work could be put under contract soon after the funds for construction were released by the President or by a joint resolution of the two houses of Congress.

The $500,000,000 apportioned to the states is to be used as follows: $225,000,000 on the federal-aid system, $150,000,000 on secondary roads and $125,000,000 for routes through cities.

British Combine photo

Sir William Bailey takes a look at one of his bridges

The success of the Bailey bridge, recognized by military commanders in every theater of war, has now been given further recognition by the conferring of knighthood on the inventor, a British structural engineer. It is now Sir William Bailey and he is seen at the right in this picture inspecting one of his brain children which the 936th Royal Engineers are building across the Rhine at Rees downstream from Wesel. Started April 18, the last section of the bridge was placed in position May 16.

New specifications for stress-grade lumber

The National Lumber Manufacturers' Association has just published a comprehensive, 64-page, "standard" for engineer design with lumber titled, *National Design Specifications for Stress-Grade Lumber and Its Fastenings.* This publication retains for proposed general peace-time use the 20 percent increase in stresses promulgated as Directive 29 of the Conservation Division of the War Production Board titled *National Emergency Specifications for the Design, Fabrication and Erection of Stress Grade Lumber and its Fastenings for Buildings.* (*ENR* Aug. 19, 1943, vol. p. 295)

The new material is intended for inclusion in building codes and specifications directly or by reference. Unlike Directive 29 it is expected to apply to all structures where designed timber members are used.

The booklet follows the pattern of Directive 29 and to a large extent presents identical material. In general it provides design information on the following: allowable unit stresses for stress-grade lumber, design loads, design formulas and provisions for beams, columns, trusses, and the like; timber connector joints, bolted joints, lag screw joints; holding power of nail, spike, drift pin, and wood screw joints, and glued laminated structural members.

The specification emphasizes the fact that the suggested higher stresses should be used only with stress-graded lumber. This is intended to eliminate the poor material that is believed to have caused much of the difficulty that has been experienced with a small percentage of recently built timber structures.

The material was prepared by Frank J. Hanrahan, structural engineer, deputy director of the Lumber Standards Division, National Lumber Manufacturers' Association, under general supervision of R. G. Kimbell, director of the Technical and Lumber Standards Division of the association. Copies are available from the National Lumber Manufacturers' Association, Washington 6. D. C. at 25 cents per copy.

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Self-liquidating plan for Mass. public works

The Massachusetts Committee on State Administration has reported favorably a bill providing for a self-liquidating method of constructing and operating highways, airports, bridges and other public improvements. An authority would be set up under this bill to provide liquidating financing through the medium of toll charges and rentals. It would be known as the Massachusetts Public Service and Development Authority.

A similar plan was proposed a year ago by the Joint Ways and Means Committee, but never reached the enactment stage. The proposed authority would undertake projects outside the jurisdiction of the Port of Boston Authority. It would build and maintain roads, bridges, airports, etc., to be paid for through toll fees. Membership is proposed to include the state treasurer and four other persons to be appointed by the governor.

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J. H. Griffin promoted by New York City board

James H. Griffin has been promoted to chief engineer of the Board of Transportation, New York City, to succeed Jesse B. Snow, who was retired on May 31 by mandatory age limitation. Mr. Griffin, at the age of 55, is the youngest man to be appointed to that position. He served as deputy chief engineer under Mr. Snow.

Mr. Griffin was graduated from Union College in 1912 with an engineering degree. He started that year as a rodman on the New York State Barge Canal. From 1913 to 1917, he was employed as a junior engineer on the construction of various subway contracts in Brooklyn. During World War I he served with the 5th Engineers, U. S. Army, in France during 1917, 1918 and 1919.

As assistant engineer he was engaged from 1919 to 1938 in the contract division on the preparation of contracts and specifications for New York City subway contracts having an aggregate value of over $750,000,000. For about eight years he was first assistant, and for about nine years was in charge of the office. From 1938 to 1944 he was division engineer of the second division in charge of subway construction in the Borough of Brooklyn, including the extension of the Fulton Street line from Rockaway Ave. to Grant Ave., of the Pitkin Ave. Yard, and of the Culver Line connection. In 1944, he was appointed deputy chief engineer. As chief engineer his salary will be $20,000 a year.

Senate increases funds for Interior Department

A 140 million dollar appropriation bill for the Department of the Interior for the next fiscal year was passed last week by the Senate. It had already been approved by the House (*ENR* May 3, 1945, Vol. p. 608) after approval by the Senate it was sent to conference.

The Senate increased the total of the bill by $39,006,304. This included $18,030,050 to be added for the Bureau of Reclamation, and $1,607,280 for the Geological Survey. Amounts providing for engineering and construction work by the Bureau fo Reclamation as increased are as follows:

General construction fund, $21,038,000, which includes $8,332,000 for the Columbia Basin Project; $4,715,300 for the Central Valley Project; $3,041,000 for the Boise Project, Anderson Ranch Dam; $2,500,000 for the Tucumcari Project; $1,300,000 for the Lugert-Altus Project; $500,000 for the San Luis Valley Project; and $350,000 for the Yakima Project, Roza Division.

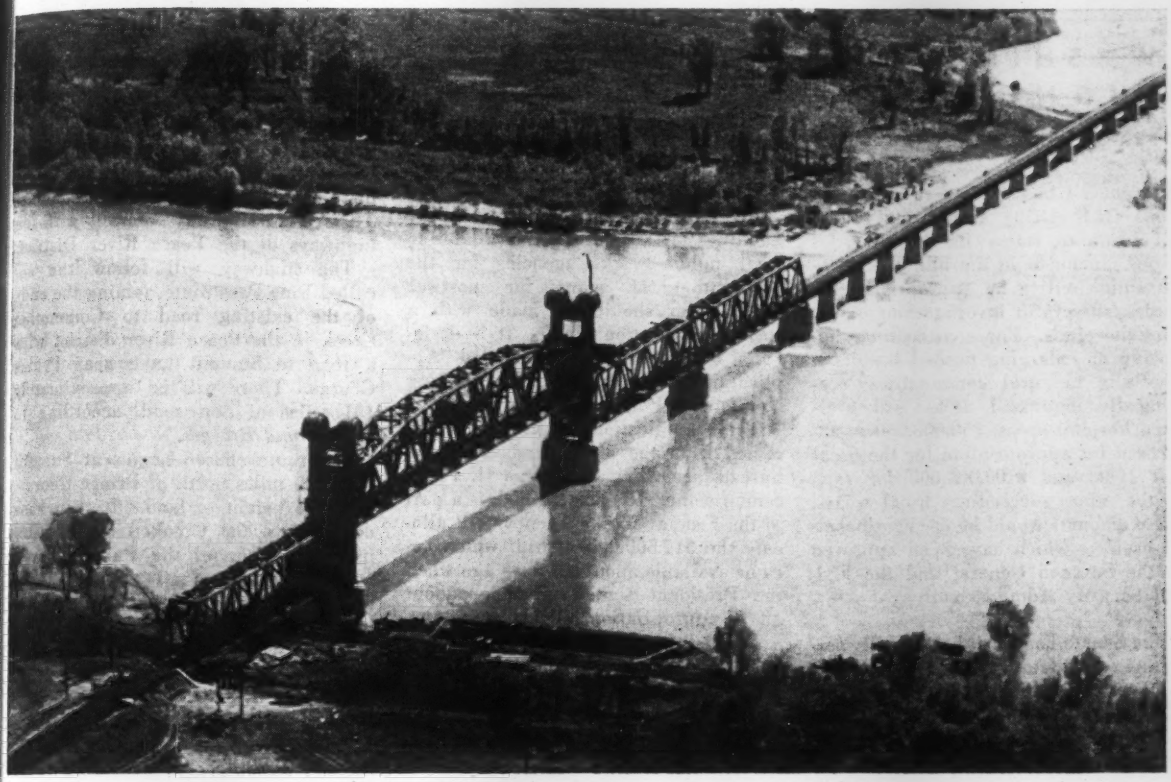
A Senate amendment provides $200,000 for construction at the Fort Peck Project. The House bill made no provision for this work. The amount for preconstruction work on the Missouri River Basin Project was increased to $4,680,000.

The fund provided for reclamation projects was increased to a total of $15,633,500. The breakdown includes: Provo River Project, $2,219,000; Colorado-Big Thompson Project, $1,400,000; Gila Project, $950,000; Deschutes Project, $500,000; Palisades Project $500,000; Hungry Horse Project, $475,000; Sun River Project, $66,000; Shoshone Project, Willwood Division, $23,500. An item of $5,500,000 for preconstruction work on authorized projects was added to the bill as passed by the Senate in place of the $125,000 previously recommended by the House.

The increase for the Geological Survey brings its total to $8,459,540. This amount includes $2,775,000 for topographic surveys; $1,995,800 for stream gaging and water supply work; and $1,337,500 for geologic surveys.

An amendment included by the Senate provides for the Bureau of Mines to continue construction on the drainage tunnel at Leadville, Colo. The amount appropriated for this work is $485,000.

The United Kingdom has made a grant of $8,145,000 to Nigeria to start a 48,000-mi. road building program, linking the colony with the All-African Highway system from the Cape to Algiers. An additional $21,865,000 will be granted later and Nigeria will contribute $23,000,000.



New type of lift span used over Missouri River near Kansas City

Incorporating unusual design features to provide a smoothly operated movable span, the $2,250,000 President Harry S. Truman Bridge, carrying a single track railroad across the Missouri River on the outskirts of Kansas City, Mo., was officially opened to trains on May 23.

Utilization of the bridge permits operation on faster schedules between Chicago, Kansas City and the west coast. One train has cut one hour from its schedule on its run from Kansas City to Chicago.

The superstructure, designed for E-72 loading, is comprised of three 250-ft. through truss spans, one 420-ft. through truss vertical lift span and 18 deck girder spans. The total length between abutments is 2,625 ft. While the three main channel piers were constructed by pneumatic process and founded about 80 ft. below low water, the other piers have wood-pile foundations.

The lift span provides a clearance above low water of 35 ft. with span down and 71 ft. with span raised. It weighs about 1,600 tons and is electrically operated by remote control from a 3-story operating house located on one of the end piers.

The bridge is jointly owned by the Chicago, Milwaukee, St. Paul & Pacific Railroad Co. and the Chicago, Rock Island & Pacific Railway Co. It was designed and the construction supervised by Howard, Needles, Tammen & Bergendorff, consulting engineers. The superstructure was fabricated and erected by the American Bridge Co. and the substructure by Massman Construction Co.

Bailey trusses used to repair Texas bridges

In what is probably the first release by the armed forces of the Bailey truss for civilian use, a combat battalion of Fourth Army Engineers under Lt. Col. Carroll C. Bridgewater recently built temporary Bailey trusses over the Sabine River near Gladewater, Tex., and over the Neches River between Palestine and Jacksonville, Tex. Until permanent bridges can be erected beneath them, the trusses will be used as temporary bridges to take the place of bridges damaged by flood waters the third week in April.

Special permission to build the trusses was given by the Army because of the military importance of the highways served by the bridges.

Court gives its finding on interstate waters

Finding of the United States Supreme Court with respect to the waters of the North Platte River were announced on June 11 in a 53-page decision. Three states, Nebraska, Wyoming and Colorado, were involved in the case, also the United States government, which claimed all unappropriated waters of the river.

Generally, the court gave support to the findings of a special master who last year made findings concerning the many questions involved.

The court found that the dependable natural flow of the river during the irrigation season had long been over-appropriated and held that a river-wide priority system would disrupt long-established uses. As a result, on the basic question of the rights of Nebraska and Wyoming, the court held that the natural flow in the Whalen-Tri-State Dam section of the river between May 1 and Sept. 30 of each year should be apportioned 25 percent to Wyoming and 75 percent to Nebraska.

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Deschutes Canal, Oregon, is half completed

Construction of Deschutes Canal in central Oregon, which will extend 65 miles from the Deschutes River near Bend to irrigable land near Madras, reached the half-way mark early in June, it was announced by the Bureau of Reclamation, as priming of the lower 26-mile section was begun.

WASHINGTON HIGHLIGHTS

Introduced in Congress recently was a bill (H.R. 1050) authorizing grants and loans to states for hospital facilities. Included in the bill is $5,000,000 authorized to be appropriated for studies, surveys or investigations of existing hospitals. For constructing, improving or enlarging needed hospitals, especially in rural communities, economically depressed areas and overtaxed hospital areas, $50,000,000 is authorized for appropriation for the fiscal year 1946, and $100,000,000 for each of the nine succeeding fiscal years. These amounts would be used for hospital projects which have been approved by the Surgeon General and the Federal Security Administrator.

The Senate has passed three bills pertaining to bridge construction over navigable streams. One bill (S. 233) grants the consent of Congress to the state of North Dakota to construct and operate a free highway bridge across the Missouri River. Another act (S. 234) approved by the Senate authorizes the construction of a free highway bridge across the Yellowstone River near Fairview, Montana. The third bill approved (S. 454) extends an act creating the Arkansas-Mississippi Bridge Commission and authorizes the commission to construct and operate a bridge across the Mississippi at Friar Point, Miss., and Helena, Ark. This last act was originally approved May 17, 1939.

As part of their work in the European war, British engineers built more than 100 airfields at a cost to Great Britain of $440,000,000 and turned them over to the United States as reverse lend-lease, a lend-lease report to Congress has revealed. This figure indicates the actual cost to Britain. It is also pointed out that the British were maintaining the field at a cost of many millions of dollars and in addition furnished to the United States air forces large quantities of goods, including 50,000 rubber tires and 34,000 inner tubes.

That the U. S. is using about two-thirds of 1 percent of the American national lumber supply in 1945 to provide 30,000 temporary emergency houses for war workers in England was also revealed by the report.

Still another highlight of the report was the fact that more than 1,000 American technicians, including many men from the construction industry, will be sent to the Far East to repair and maintain China's transportation system. This is part of the joint program of sending more than 1,000 Chinese men to the United States under lend-lease for intensive engineering and industrial training (See *ENR* March 22, 1945, vol. p. 373, for a detailed story on this work).

Requests to the Bureau of Community Facilities for advances now available to local public works agencies for the preparation of plans for postwar construction should be made with a special application blank. It is designated BCF Form 3 and is entitled "Application for Advance for Planning Non-federal Public Works."

These application blanks may be obtained from the division offices of the bureau, according to George H. Field, commissioner. His office, which is a part of the Federal Works Agency, will allocate the $17,500,000 of aid, which became available about ten days ago when the President signed an independent offices appropriation bill (H.R. 1984).

Details of how the money will be distributed were given in the May 10 issue of *Engineering News-Record*, as were the names and addresses of the division engineers of the bureau with whom the applications must be filed.

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Texas water and sewer system leased by FWA

Central water supply and sewage disposal facilities serving seven adjacent residential developments near Houston, Tex., will be completed this month by the Federal Works Agency. The project for which the FWA made available $790,000, was undertaken at the request of the Harris County Market Street Road Fresh Water Supply District No. 5, to provide water and sanitation services in a rapidly expanding area that lacked adequate facilities.

Under a lease agreement with the water district authorities, yearly revenue from the use of the facilities will be divided with 8.88 percent retained by the district, and 91.12 percent returned to the federal government. The latter is expected to receive $36,000 annually and the lease is renewable on a yearly basis.

Territory served by the facilities comprises some 1,200 acres of residential area ten miles northeast of Houston's downtown section, and near a highly developed industrial zone. The population is about 15,000.

The water supply system includes a new well, pumping plant, distribution system facilities and a 300,000-gal. reservoir. The sewage disposal facilities include a collection system, Imhoff tanks and trickling filters.

B. C. calls for bids on Peace River highway

Bids have been asked by the British Columbia Department of Public Works, due June 27, for the construction of a highway to connect the Peace River district with southern British Columbia. The Alaska Highway connects with the highways of the Peace River District.

The highway will follow the so-called Pine Pass route, joining the ends of the existing road to Commotion Creek in the Peace River district with a road to Summit Lake near Prince George. There will be approximately 151 miles of new road, according to *"Roads and Bridges."*

The route chosen begins at Summit Lake, 32 miles north of Prince George, near the height of land. It then runs north down the Crooked River valley into the valley of the Parsuit River, which it crosses at mile 66 on a major bridge. Thence swinging northeasterly it goes up the valley of the Misinchinka River to Pine Pass, where the summit of the Rockies is crossed at El. 2,850 ft.

The highway will swing in horseshoe fashion through the pass, taking an easterly direction along the Pine River to Commotion Creek at mile 151, where it will join the present road system, reaching Dawson Creek 85 miles farther on.

Good alignment and grade will be obtained throughout almost the entire route, the country lending itself well to highway construction. Gravel and timber are plentiful.

Information available indicates that already over 20 leading Canadian road contracting firms have expressed their intention of filing bids on this job.

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Puget Sound-Columbia canals recommended

Construction of a canal system to connect the Columbia River with Puget Sound and the inland waterway to Alaska was urged by the Washington State Legislature recently in a memorial forwarded to Congress.

The memorial recommended three canals, Columbia River to Willapa Bay on the Washington coast, thence to Grays Harbor and on to Puget Sound. Stressing that the canals would provide a cheap method of log transportation, the memorial recalled that the Washington State Canal Commission conducted a survey of the proposed project a few years ago and reported that the canal system could be constructed at a reasonable cost.

Waddell & Hardesty now Hardesty & Hanover

Announcement has been made by Shortridge Hardesty that he has formed an engineering partnership with Clinton D. Hanover, Jr., to be known as Hardesty & Hanover, succeeding to the consulting practice of Waddell & Hardesty, with offices at 101 Park Ave., New York City.

The change marks the passing from the roster of consulting engineers of one of the famous names connected with bridge engineering not only in the United States but abroad, that of J. A. L. Waddell, who began engineering practice in 1887 when he opened a consulting office in Kansas City, Mo. Later Dr. Waddell formed various partnership; first Waddell & Hedrick, next Waddell & Harrington, and then Waddell & Son, all in Kansas City. In 1920 Dr. Waddell moved his office to New York, operating under his own name until 1927, when he formed the partnership with Mr. Hardesty, who had been with the firm since 1908 when he was employed as a draftsman. The new partnership continues the business of this long line of wellknown bridge engineering firms.

Mr. Hardesty was educated at Drake University and Rensselaer Polytechnic Institute, while Mr. Hanover is a graduate of Yale University in 1922. The business of Waddell & Hardesty is also not new to Mr. Hanover, who entered the employ of Dr. Waddell in 1924 and remained with the firm until 1935. Then, after a year as engineer for the Taylor-Fichter Steel Corp., he went with the City of New York, and in 1938 became chief of the bureau of bridge design of the Department of Public Works.

Current work of the new firm includes several important projects, among which are the Cross-Bronx Expressway; the Van Wyck Expressway (which will be one of the main highway connections to New York's Idlewild Airport); the Stillwell Ave. Bridge in New York; a 250-ft. clear span double-leaf bascule bridge for Buffalo, N. Y.; and a lift span over the Passaic River for the State of New Jersey.

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Sewers, streets, bridges planned for Tacoma

Preparing for a postwar program of sewer improvement and street and bridge construction, Tacoma, Wash., has been receiving bids for a $3,500,000 bond issue voted at last November's election.

The city's sinking fund board, having been informed by financial authorities that interest rates are more favorable now than they may be at the close of the war with Japan, plans to reinvest the money so it will be drawing interest up to the time it will be needed to pay the costs of the projects.

Of the total aproved by the voters, $3,000,000 will go for sewer improvements and $500,000 to match expected federal funds of probably $750,000 for street and bridge work. Sewer improvements include construction of a trunk line, five tributary mains and a sewage treatment plant in the southern section of the city. In the northern section all outfalls will be extended for some distance to deep water.

JOBS OF THE WEEK

AIR BASE, Fairfield-Suisun, Calif.

Morrison-Knudsen Co., San Francisco, and Stolte, Inc., Oakland, have been awarded a contract for additional construction at Fairfield Suisan Air Base by U.S. Engineers, Sacramento, at $19,000,000.

REFINERY, Torrance, Calif.

General Petroleum Corp., Los Angeles, Calif., will build delayed coking plant at refinery to cost about $3,049,000. The construction contract has been awarded to M. W. Kellogg Co., Los Angeles.

HOUSING, Chicago, Ill.

Sherry-Richards Co., Chicago, Ill., was the lowest bidder for constructing 2 and 3-story housing project, when the Chicago Housing Authority, Chicago, opened bids at $2,512,500. Public Housing Authority will help finance. Loebl & Schlossman, Chicago, are the architects.

EXPERIMENTAL FLIGHT HANGAR, Boeing Field, Wash.

Mowat-Sellen Co., Seattle, will build a 725x180-ft. industrial building type experimental flight hangar to cost $1,147,492. U.S. Engineers, Seattle, Wash. awarded the contract.

RUNWAYS and TAXIWAYS, Maxwell Field, Ala.

U.S. Engineers, Maxwell Field, awarded a contract for reinforcement and reconstruction of runways and taxiways at Maxwell Field to Wright Contracting Co., Columbus, Ga., at $1,666,347.

CONSTRUCTING AND REPAIRING ROADS, State of Chihuahua, Mexico.

State of Chihuahua, Chihuahua City, will repair and construct state-wide roads by its own forces. The estimated cost is $2,800,000.

FACTORY, Toronto, Ont.

Massey-Harris Co., Ltd., Toronto, Ont., has awarded to A. W. Robertson, Ltd., Toronto, a contract to build a factory at an estimated cost of $1,000,000.

CALUMET GENERATING PLANT, Chicago, Ill.

Commonwealth Edison Co., Chicago, Ill., has awarded a contract for a brick, concrete and steel addition to the Calumet generating plant to Herlihy-Mid-Continent Co., Chicago, Ill., the estimated cost is $11,000,000. Holabird & Root, Chicago Ill., are the architects. Sargent & Lundy, Chicago, are the engineers.

STOREHOUSE, Philadelphia, Pa.

John McShain Inc., Philadelphia, Pa., has been awarded a contract for the construction of storehouse, roads, tracks, etc., at Naval Ammunition Depot, by the Bureau of Yards & Docks, Navy Department, Washington, D. C., at $1,639,200.

HOUSING, Oahu, T. H.

Public Housing Authority, San Francisco, Calif., has awarded contracts for the construction of 158 dwellings and a community building to Pacific Construction Co., Honolulu, at $1,755,281. The construction of 482 dwellings has been awarded to James W. Glover, Honolulu, at $1,492,392.

HOUSING, Hawthorne, Nev.

Bureau of Yards & Docks, Navy Department, Washington, D. C., awarded a contract for the construction of additional low-cost housing and personnel facilities at Naval Ammunition Depot to Johnson-Drake & Piper, Inc., Oakland, Calif., at $1,077,121.

Note—Additional bidding and contract news on many projects large and small appear in the Construction News section beginning on page 237.

OBITUARY

James Stewart Green, 41, chief engineer of the Louisville, Ky., division, U. S. Engineers, died May 26. He was graduated from Purdue University, and in 1925 joined the U. S. Engineers at Louisville and later was at St. Paul, Minn. Following the flood in 1937 he was reassigned to Louisville to work on flood control. He was appointed chief engineer in 1943.

Louis N. Beals, 66, former chief civil engineer of the city buildings and inspection division, St. Louis, Mo., died May 30. He had assisted in revising the city's building code and served as chief engineer of the division from 1926 to 1928 and from 1941 to 1944.

George Stupp, 87, one of the founders of the Stupp Brothers Bridge and Iron Co. and chairman of the board, St. Louis Structural Steel Co., prior to his retirement, died June 3 at St. Louis, Mo. With his brothers, Peter and Julius, he founded the Stupp Brothers concern in 1874, was president and later chairman of its board until 1919, when he became associated with the St. Louis Structural Steel Co.

George E. Hawthorn, 55, a professor of civil engineering at the University of Washington for 20 years, died June 2 in Seattle. He was a 1915 graduate of the university. Before joining the faculty in 1924, he was chief draftsman for the Washington State Highway Department.

D. Earl Beattie, 55, Salem, Ohio, civil engineer, died May 31. He formerly operated the Beattie Construction Co., Akron, and directed WPA street projects in Alliance from 1938 to 1940.

Herbert E. Bussom, 48, for 21 years a civil engineer in the highway division of the Massachusetts Department of Public Works, died at Lexington, Mass., on May 29.

Louis T. Klauder, 65, Philadelphia, Pa., consulting engineer, died May 26 at Moorestown, N. J. Mr. Klauder was for several years chief engineer of the Philadelphia Rapid Transit Co. During the last year he was president of the Pennsylvania Society of Professional Engineers.

Ed Skogman, 45, Omaha, Neb., contractor, died at Clinton, Iowa, recently. He was a partner in the firm of Skogman Construction Co., Omaha, and was engaged on a federal drainage contract at Clinton at the time of his death.

Abraham L. Brockerman, 77 retired contractor and builder, died May 31 at Limerick Center, Montgomery County, Pa. He had been in the contracting business for more than 50 years.

Russell H. Allen, 61, Hartford, Conn., executive secretary of the Hartford Housing Authority, died May 30. Under his direction the FHA completed housing projects in Hartford totalling 713 dwelling units. He also headed the 1,000-family project at Charter Oak Park and the 200-family Blue Hills Homes.

C. Walter Johnson, 62, civil engineer of Seattle, Wash., died there May 26. He was graduated in civil engineering at Purdue University. He had served 10 years as an engineer with the Minnesota State Highway Department, was president of a Minnesota bridge company and directed construction in Pennsylvania, Missouri and Illinois. He moved to Seattle two years ago and had been employed as a construction supervisor in the plant engineering department of the Boeing Aircraft Co.

Ensign George L. Theiss, Jersey City, N. J., valedictorian of the class of 1944 at the Stevens Institute of Technology, was officially declared dead on May 30. He had been reported missing in action on April 24. Ensign Theiss was assistant engineer on the minecraft Emmons, destroyed by an explosion at Okinawa.

Charles Robert Whittier, 88, former president of the Whittier Elevator Co., a pioneer in the old plunger-elevator design, and more recently affiliated with the firm of Sanderson & Porter, construction engineers, died June 5 in New York City. A civil and mechanical engineer for 68 years, Mr. Whittier retired two years ago. Born in Lawrence, Mass., he was a cousin of John Greenleaf Whittier, the poet. After being graduated from Worcester Polytechnic Institute in 1877, Mr. Whittier served as engineer in the design and planning of the Union Pacific Railroad.

Frank S. Hitch, retired highway construction engineer of Williamston, N. C., died June 3. He was connected with the North Carolina State Highway Commission from 1920 to 1944.

Harold D. Farmer, 56, Oregon Public Roads Administration senior engineer, who had been missing since May 11, was found dead in the upper Clackamas River area near Oregon City June 4. Mr. Farmer had been working in the area with a locating engineer when he disappeared.

Sanitary engineers form union in Chicago

Some 80 technical engineers, architects, chemists and engineering-clerk employees of the Sanitary District of Chicago have joined a recently formed local union known as the Sanitary District of Chicago Technical Employees, Local 903 of the American Federation of State, County and Municipal Employees (A.F.S.C. & M.E.). The new Local 903 received its charter on May 16 from the International A.F.S.C. & M.E. union, which has headquarters at Madison, Wis., and which is affiliated with the A.F. of L.

Formation of Local 903 is an outgrowth of the Sanitary District of Chicago Engineering Association, which was formed two years ago to promote mutual welfare, cooperation and goodwill among the employees of the Sanitary District of Chicago. The new organization hopes to include most of the 225 employees of the Sanitary District who are eligible for membership, and who are not already under the jurisdiction of the trade unions. No limitations have been established for membership requirements other than the classification given above; all are eligible, from departmental executives and other professional engineers to the lowest paid engineering-clerk.

E. A. Janssen, assistant civil engineer in charge of the cost and estimate section, construction division of the Sanitary District was elected president of Local 903 on June 5. Other newly elected officers include R. A. Shott, vice president; W. T. Collins, secretary and L. P. Pfeiler, treasurer.

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No WPB O. K. needed for preliminary road work

Preliminary work on construction of public highways and streets may be undertaken without War Production Board authorization if no lumber or other building materials, except drainage pipe and culverts, are permanently installed, WPB announced June 4.

This exemption for grading, ditch-digging and similar earth-moving operations is added to Order L-41-e, controlling public highway and street construction, by an amendment providing an exemption corresponding to the one established in the May 29 revision of Order L-41, which covers all other types of construction, WPB said.

The Week In Engineering and Construction

(*Continued on page* 132)

Comment and Discussion

Readers' opinions on matters that concern engineers and contractors

Fabrication in the Nineties

Sir: In *ENR* Jan. 4, 1945, vol. p. 14, was a notice of the death of Corydon T. Purdy, at the advanced age of 85. To Mr. Purdy belongs the chief credit for developing the principles of design of the steelwork of modern skyscrapers. As engineer in the early nineties for the new firm of George A. Fuller and Company in Chicago, he developed the basic ideas that are still used in proportioning the beams and columns and foundations of these buildings. Without precedent to guide him, he worked out the many problems successfully, including those of the unique "floating" foundations used in the early Chicago skyscrapers, wherein under a computed loading of 3,500 lb. per sq. ft., the underlying clay was compressed to a settlement of 4½ in. under each footing. The actual settlements usually came within a fraction of the computations, and Mr. Prudy's floating foundation proved to be both economical and effective.

Field work often faulty

In those hectic days, however, good theory was often marred by faulty work in shop or field. Thus, at the south end of the Old Colony Building a basement column had to be set back a few feet so that its foundation would not encroach an adjoining property. The columns above were to be placed at the property line. This meant a cantilever support. As one of Mr. Purdy's engineers, I found that a very heavy box girder must be used, and this was accordingly provided. I shall not forget my feelings when I saw it riveted in place. It had been thrown together in the shop any old way, and one side was resting on one edge of the basement column while the other side was cocked up a good inch in the air. The next column above, on the end of the cantilever and destined to carry 16 stories, rested on one edge on the other side of the girder and its other edge rested on space. But erection was going blithely on. No shims or wedges were used to fill the empty spaces, and for more than 50 years those two columns and the girder have been straining under eccentric loading enough to turn a modern designer's hair gray. In those days if the steel didn't come right, it was just too bad but it was certainly no excuse for holding up the work.

In another building I had provided a 24-in. I-beam to carry a very heavy roof load. I saw it soon after the building was finished. Some demon pipe-fitter had cut out the lower flange and half the web near the quarter point and had run a 12-in. pipe through the gap. No doubt it so remains unto this day.

Many a structural crime and many a butchered piece of steel lie hidden behind the tile and plaster of those Chicago skyscrapers of the early nineties. But so far as I know, no harm has ever resulted.

DAVID A. WATT
St. Petersburg, Fla.

Separate Design and Construction

Sir: I read the letter by Mr. George Winter (*ENR* April 19, vol. p. 556) with great interest, and also with considerable surprise. To my mind, the construction field might well be divided into three zones: research, design, and construction. Our institutions of learning should provide the first; our consulting engineers, the second; and the construction organizations, the third. To have a "dozen or more" contracting firms submitting competitive designs for a significant bridge project—and the independent consulting engineer called in, at long last, to advise which design to accept—would be a terrible waste of effort.

In such a program a limited list of contracting firms would presumably be prepared, a consultant secured, and designs invited. Presumably the competitors are paid, but on a large project, such as a major dam or bridge, no one could afford to spend the money requisite to a thorough analysis. The tendency would be to first get the job by proposing a scheme that the consultant would aprpove and then to design the structure. Ergo, why not have a consultant design the structure and then let construction organizations work up costs and submit suggestions for modifications with corresponding bids? Thus, a base bid would be made, with plus or minus "extras" if this or that modification is accepted.

Role of teachers

It appears to me that the place for emphasis is on the teaching of engineers. In the classroom a gifted teacher can do much to stimulate the imagination of his pupils, and in the final analysis the possibilities for research furnished by our institutions of learning, together with the experience of practicing engineers, must be united to secure the enlightened progress that is so much desired by all scientific men.

Another zone of progress that must not be overlooked is the one where research men work to produce new materials that give the engineer new possibilities in design. Excellent examples of these are the new steels that make modern suspension bridge spans possible.

To my mind the ideal arrangement would consist of (1) a project, (2) an engineer or engineers, (3) a suitable construction organization; (2) and (3) chosen for the characteristics that particularly point them out for the project.

New standards must be accepted

Criticism and investigation of existing design criteria must go forward and new standards must be accepted as rapidly as may be consistent with sound engineering.

It is true that our text books are limited to undergraduate work and that for the moment there is no remedy but the magazines and the proceedings of the several engineering societies in the United States and abroad. But I believe that the nucleus from which progress grows is composed of two elements; a real teacher plus a student who has in him the real attributes of the engineer.

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EDITORIALS

VOLUME 134 NUMBER 24

June 14, 1945

Birthday for Bases, Too

IN CELEBRATING the first year of operations against Japan for our great B-29 bombers, on Friday of this week, some of the acclaim should be reserved for the bases from which they fly and for the men who built the bases. A base for planes such as these is no ordinary installation. In England, field facilities for about fifty B-17's were estimated to represent a seven million dollar construction job by peacetime standards. A B-29 base, one can be sure, is at least that big and, with 500-plane raids becoming common, there could easily be a score or more of B-29 bases already in existence within striking distance of Japan. The digging and the dying that went into their construction deserves to be remembered, and a fitting way to give the remembrance meaning is to make each successive base better by utilizing the lessons learned on the earlier jobs. Perhaps this is being done, but unfortunately the Air Corps is rather tight-lipped on the subject so that only its own experts are informed. The problem of heavy airplane wheel concentrations, involving questions of pavement thickness, base consolidation, subgrade drainage and load transfer across joints, is one that many besides the military will have to wrestle with in the future. There would, therefore, be wide appreciation of a little more relaxation on release of information on a subject whose military security value is far from "top secret". After all, the Japs don't have any B-29 exploits to celebrate or B-29 fields to be proud of and to attempt to improve.

Standards for Concrete Members

STANDARDIZATION of concrete column and beam sizes in the interest of form economy is an interesting suggestion made by the Reinforced Concrete Association of England. The idea has merit, for standardization has long been followed in sizes of rolled structural steel members. Elimination of odd sizes of concrete members would largely do away with the present necessity of special forms for almost every job. Standardization would permit greater re-use of forms from job to job, and would encourage development of more substantial forms, such as metal and metal-clad units. Of course, some extra concrete materials would be required in selecting the next standard size member over that theoretically required, but there still would be a possible saving in form costs. With cost of forms representing from one-third to one-half the cost of reinforced concrete construction, any proposal that holds promise of reducing this percentage is worth considering.

Toward More Permanent Concrete

CONCRETE is certainly one of the best construction materials but it is far from perfect for some of the exacting demands that engineers place on it as they seek to extend its usefulness. We have learned how to get satisfactory internal strengths in concrete, but less progress has been made toward giving exposed surfaces the maximum durability. Several means of securing better surfaces have been devised, all based on reducing the water content of the concrete near the forms to a minimum. An article in this issue describes the application of one such process, use of vacuum to draw excess water from the surface, for "case-hardening" the spillway slope of Shasta Dam. If this and other efforts to preserve exposed surfaces are reasonably successful, a significant advance will have been made in extending the usefulness of concrete.

Men for Design Work

PLANNING FOR POSTWAR CONSTRUCTION is lagging due to a continuing scarcity of men to do the design work and drafting. Public work is suffering more from this than are private operations because of the low pay that most public agencies can offer. Their rates, generally, are fixed by statute and cannot be increased easily. Cost-of-living bonuses are of little help. It has been suggested that this shortage could be met in part by selective release of men from the armed forces, but that plan does not appear practicable for several reasons. A more effective way would seem to be that of assembling specific personnel requirements and placing these requirements with regional offices of the U. S. Employment Service and the Engineering Societies Personnel Service. Since men released from military services will gravitate to those offices, possession of such information should make it possible for them to direct men to available jobs with a minimum of lost time. In positions where the pay is low, these men may not stay long, but they will have helped to get plans completed and in turn will have been helped in getting readjusted to civilian life.

Start to Expand Construction Now

RECENT RELAXATION of WPB restrictions on construction operations (*ENR* May 31, vol. p. 747) will be of some help in accelerating the rate of activity of the construction industry and thus aid in preparing it for greater future output. But this lifting of restrictions must be looked upon as only the first step in a program of progressive relaxation that ought to be put into effect as rapidly as war conditions permit. There is great need for further removal of restriction on private as well as public work, especially on heavy construction, because it is in this field that construction-industry resources need to be mobilized and expanded if we are to have available the capacity required by the postwar economy.

Elsewhere in this issue is given a summary of testimony by E. J. Cleary of the *ENR* staff before the Special Committee on Post-War Economic Policy and Planning of the House of Representatives. Therein Mr. Cleary calls attention to the fact that at no time in the past has the construction industry expanded its operations by more than 62 percent in one year. As the industry now is operating at the abnormally low annual rate of $3.3 billion, an annual increase of 62 percent means that more than three years will be required to reach the yearly goal of $15 billion projected for the postwar period.

If the operations of the construction industry could be accelerated now to the greatest extent that is possible without detracting from the war effort, two things would be accomplished: the groundwork would be laid for a much quicker expansion of capacity at the end of the war with Japan, and jobs would be provided for men with construction experience now being released from the Army.

Expansion of construction operations under present conditions will not be too easy. Only a few construction materials are readily available, and others like lumber are difficult or next to impossible to obtain. Nevertheless, many projects, notably highways and airports, can be started, as can such time-consuming operations as sinking the foundations for proposed bridges and buildings. These do not require many men and no large amounts of critical materials.

It is not realistic to presume that the construction industry is ready and able to accomplish whatever volume of work is thrust upon it. This industry, the same as others, requires time for "tooling-up" —assembling manpower, materials and equipment—and its capacity for a given volume of accomplishment depends in large measure on its initial rate of output. Therefore, the faster this rate can be geared up now, the better prepared will be the industry to meet postwar demands. Spokesmen for every element of the construction industry can do a great service in advocating the acceptance of this principle by the War Production Board and legislative leaders.

Rates for Industrial Wastes

WELL ESTABLISHED in theory and by precedent is the principle that industries contributing liquid wastes to a municipal sewage treatment plant should defray the cost for handling these wastes. What is not clearly defined, however, is the manner of determining a fair and equitable charge for such service. This situation lends special interest to the article on p. 825 of this issue, in which Edmund Besselievre examines the question of municipal rate structures for industrial waste treatment.

Mr. Besselievre's analysis, which provides a broad basis of guidance for municipal engineers, is further enhanced by the addition of operating costs at thirty sewage treatment plants from which he derives a yardstick for evaluating the cost of service based on units of purification accomplished. The most significant point to be noted from Mr. Besselievre's discussion, however, is that it is virtually impossible to establish a formula for rate-making applicable in all situations.

This points to the necessity for each community to consider industrial waste rate schedules in the category of a "tailor-made" job. And it is a job in which local industries should be invited to participate with municipal officials. Not only would industrialists be "educated" on disposal process problems and costs, but they likewise could contribute information regarding their wastes that might lead to more efficient operation of joint treatment facilities. Honest cooperation coupled with friendly negotiation and expert technical advice are the factors that will do most to assure an equitable rate structure for a municipality and its local industries.

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Repaired Lock Gates and Bridges Make Europe's War-Wrecked Harbors Work

Waldo G. Bowman
Editor, Engineering News-Record
(By air mail from the European Theater of Operations)

***Contents in Brief**—Reconstruction of European harbor facilities, which were destroyed by Allied bombing and shelling followed by German demolition, called for the exercise of considerable ingenuity. Because the tides in these ports are vastly greater than any experienced in our own ports, movement of ships requires locked basins. These in turn necessitate many bridges to facilitate road and rail traffic to and from the docks. How these harbors were restored to usefulness by the repair or replacement of these essential facilities is told in this article.*

A FUNDAMENTAL of German strategy against attacks from the West having been to deny us the use of harbor facilities on the continent for as long a time as possible, it follows that the ports that they relinquished were thoroughly wrecked by demolition, bombing and shellfire. As a consequence, one of the most important Army Engineer jobs in the European Theater of Operations, critical in time and high in priority, has been to repair or replace harbor facilities necessary for unloading our supply ships.

Two big divisions of the job involve closures for the entrances to basins where ships can be protected from the tides, and bridges across the entrances so that land access is possible to all parts of the port for trucks and trains. There are, of course, such other necessary tasks as removal of mines and sunken craft, which is a Navy responsibility beyond the low tide mark, and the building of pile wharfs over and out from destroyed quays, an Army Engineer assignment. But the bridges and particularly the basins, represent basic requirements. Along Europe's western coast, where a tide of

Fig. 1. Demolition-damaged gates of harbor basins being repaired in a drydock, part of whose wall was also blown in.

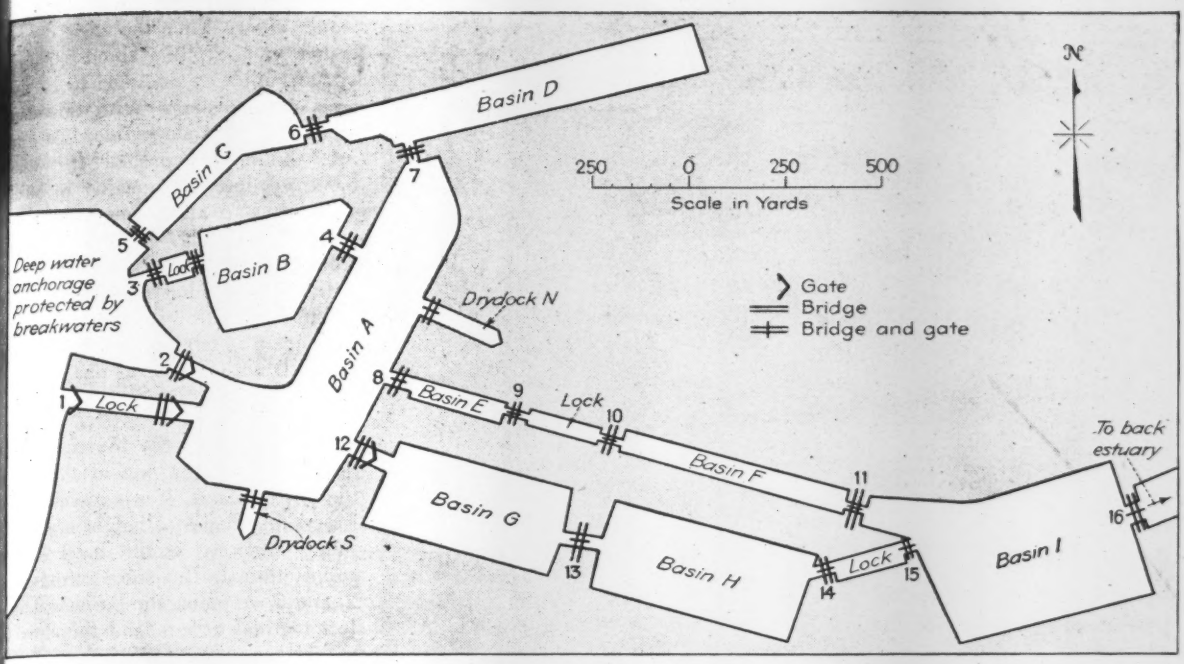


Fig. 2. Typical harbor on west coast of Europe made up of a series of wet basins protected from tidal changes by gates and locks. German demolitions, concentrated on the basin entrances, had to be overcome before the harbor would function.

about 25 ft. is the rule, harbors won't work without them.

Only by continuous exercise of hard labor and ingenuity, some of which produces successful results, are Europe's war-wrecked harbors being made to work again. In the first place, every basin or lock gate and every bridge is damaged differently, so that no type of repair can be standardized. And second, and worse, there are never the right materials nor enough tools to do a job properly. Therefore, every harbor that is opened involves a large number of essentially separate and different construction operations, some of the interesting ones being in one harbor, some in another. Consequently, for the purpose of this article, a synthetic harbor has been laid out, which requires numerous repairs to make it work. While the harbor is fictitious, the repair procedures described have all been carried out.

Layout of "synthetic" harbor

As will be seen from Fig. 2, the harbor consists of a main basin A and supplementary basins B to I inclusive, all located inshore from a deep-water ship anchorage. These basins, entered either through locks or through a single set of gates operated at high tide, are always full of water and not affected by the tides, so that ships lying right up to the quayside can unload in them continuously.

In contrast, ships that have to anchor offshore must send their supplies in by slow lighters, and even these shallow-draft craft have difficulty in reaching quayside at low water. In some harbors finger piers and moles have been extended from shore to deepwater, but these, even if they have not been seriously damaged, offer a relatively small amount of unloading space compared to the basins.

The aim of the Germans, therefore, has been to put the basins out of service by blowing their gates and thus draining them at low tide. Moreover, draining the basins subjects their masonry walls to an unbalanced hydrostatic pressure inward, creating a tendency toward collapse. Hence the necessity for quick repair of the gates is twofold—first, to save the basins from progressive failure, and second, to get them back into service.

The basin layout of Fig. 2, before its facilities were damaged, could be entered by five different routes, one of which was through an estuary in the rear and thence through entrance 16 into basin I; it will be noted that this basin is separated from the others by locks 14-15 and 9-10 since its tide movements are different from those

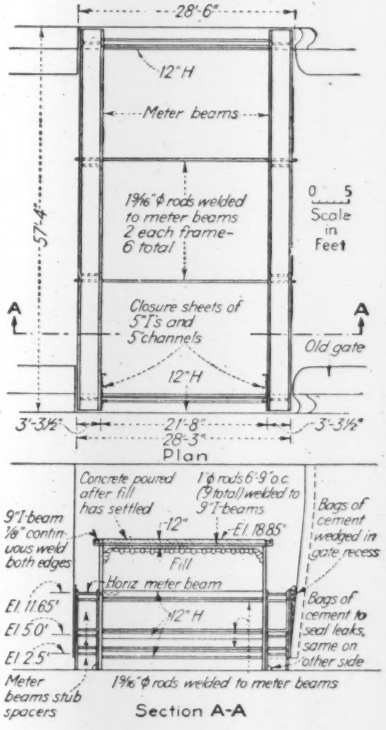


Fig. 3. Welded steel frame cofferdam installed in entrance 7 and filled with rubble (See also Fig. 5, p. 83) to provide a weir that would permit tide to move in and out of basin D and at the same time would hold enough water in the basin to supply the condenser pumps of a nearby power plant.

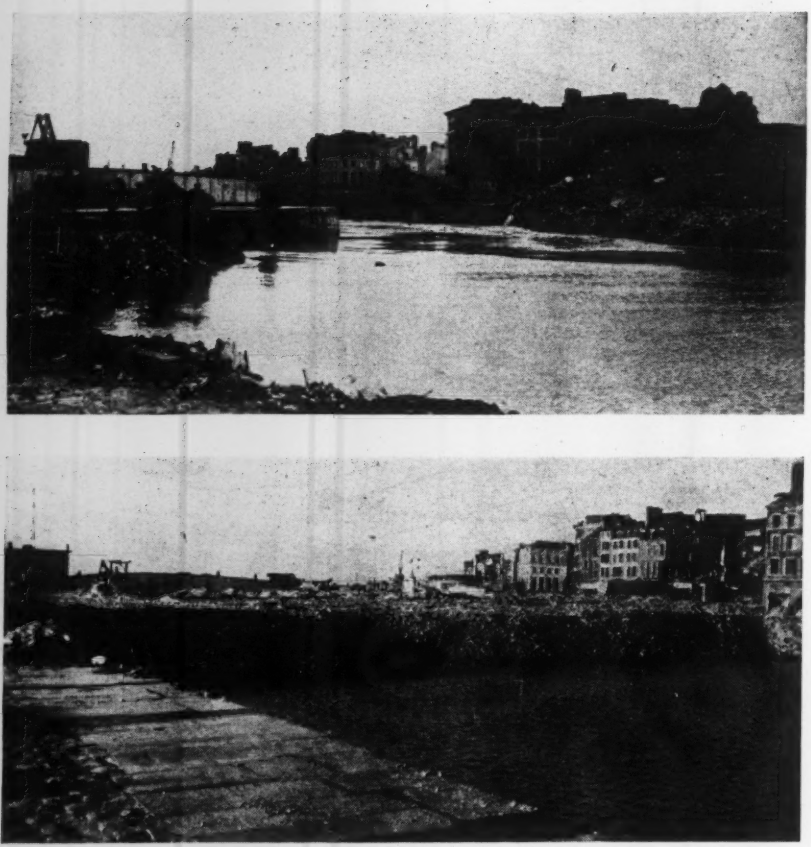


Fig. 4. Entrance was filled with a dam as a repair measure. Top view shows fill being made by two-wheel carts, while across the entrance bulldozers are getting ready to push a 6,000-yd. stockpile into the opening in a continuous 30-hr. operation to produce the dam shown in the bottom view.

in the remainder of the harbor. The four front entrances, leading to main basin A, were: (a) directly through lock 1; (b) directly through gate entrance 2, which was used to admit the very largest ships at high tide only; (c) through lock 3 into basin B, and thence through gate 4; and (d) for small craft, through gate 5 into basin C, from there through gate 6 into basin D and thence through gate 7 into main basin A. The principal other feature of the layout is the availability of parallel routes to basin I—one through basins E and F, the other through basins G and H.

German efforts at demolition were concentrated on the gates at entrances 1, 2, 5 and 7. Slight damage was also done to some old wood gates at 3 and 4, but it was possible to close them, and take this entrance route out of service.

Bridge demolition was complete at locations 7, 8, 9, 10, 11 and 12. A bobtail swing span was used at 7, and it could be lifted back and converted to a fixed girder span. The other bridges were Scherzer rolling lifts, and they were replaced by Bailey spans at the highway crossings and by a Unit Construction Railroad Bridge (UCRB) at the railway crossing at location 11. Such in brief was the situation which called forth a number of troublesome and difficult construction operations.

Closing a basin with a fill

The local authorities, having decided that basin C was not important to the future harbor layout, agreed to have its entrance 5 blocked with a fill, and to designate the whole basin as dump for rubble from bomb-wrecked structures. With tides up to 25 ft., a considerable current raced through the opening, so that placing such a fill was not just a routine operation.

The procedure was to have the local authorities haul in the rubble in their two-wheel carts, and end-dump a fill out as far as the current would allow. Then the carts concentrated on stockpiling about 6,000 cu. yd. of rubble at one side to be used as a closure plug. With this done, and starting at slack tide, two Engineer bulldozers pushed the whole 6,000 yd. into the opening in 30 hr.

Before and after views of the site are shown in Fig. 4. Now protected from the tides, the fill can be extended until the whole basin is reclaimed as a building site. In the meantime, entrance 6 is left open so that basins C and D act together as one.

Closure with a weir dam

Basin D being the source of condensing water for one of the port's big power plants, it was essential that it be kept filled to a height above the pump suctions at the head of the supply tunnel. But since entrances 1, 2, and 7 were out, the basin was subject to tidal action, and therefore of no service to the power plant during about half of each 24 hr. The solution was to build a weir dam across opening 7, high enough to provide suction at the pump intakes, approximately 20 ft. of water, but not so high that it would keep the tide from filling the basin twice a day.

The details of the dam, a steel-framed box filled with rubble from bombed buildings, are shown in Fig. 3. Three tiers of captured German "meter" beams (39.5-in. I's) laid flat and with their ends set into the old gate recesses in the entrance walls, comprise the principal "upstream" and "downstream" frame members. They are spaced apart vertically by pieces of meter beams set on end, and horizontally by 12-in. H-beam struts, the whole assembled by continuous welds along all abutting edges. In addition, the frames are kept from spreading apart by $1\frac{9}{16}$-in. dia. rods.

This heavy assembly of steel was dropped into the opening in two pieces by two 30-ton crawler cranes, each piece taxing the lifting capacity of the equipment. Next came the critical problem of effecting the closure against the currents. The "sheets" to be used consisted, as indicated in Fig. 3, of a welded assembly of 5-in. channels and 5-in. I-beams. Three sheets of these steel sections were used for both the upstream and downstream faces of the box, the end sheets in each case being installed first, followed by the center one which lapped over them and completed the closure.

Placing these center sheets required fast action because slack tide lasted only 20 min., and even then the current only slowed to 5 m.p.h. It was necessary to get both center sheets in and start the rubble fill before the tide changed. Cranes dropped the sheets into place, and bulldozers then went to work pushing in rubble from a 1,000-yd. stockpile on either side. These operations are illustrated in Fig. 5.

Repairing main lock gates

Entrance 1, being a lock into main basin A, was most important to the operation of the harbor, for through it boats as big as Liberties and larger could enter or leave at any stage of the tide. The Germans knew this and took special pains to render the gates useless.

There were four of these gates or leaves, two outer and two inner, each swinging on hinges like a door and each weighing 275 tons when out of the water. The south leaves of both gates were damaged beyond immediate repair, the one on the inner gate having been blown completely off its hinges. The north inner leaf was undamaged, but the north outer had a 12x20-ft. hole in it, about halfway down. A steel plate hung from the top of the gate on the inside and held against it by water pressure served to repair this gate, but getting the south leaves operable presented many and trying difficulties.

With the aid of U. S. Navy salvage crews, the south inner gate was picked up and towed to drydock N to be repaired by a French contractor assisted by Army Engineer mechanics. The work consisted in re-

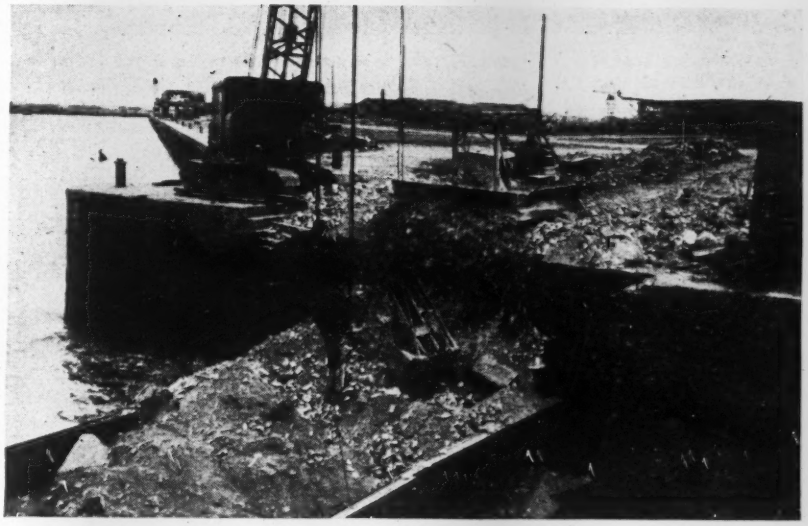
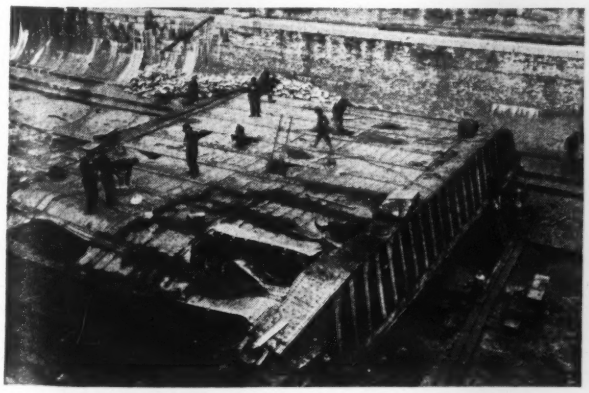


Fig. 5. Center closure sheet of welded structural I's and channels being dropped into the downstream face of the weir dam at entrance 7. The swift-running tide made it a delicate and hazardous operation. Lower view shows filling the steel frame cofferdam at entrance 7 with rubble. A bulldozer pushed it in and a clamshell distributed it.



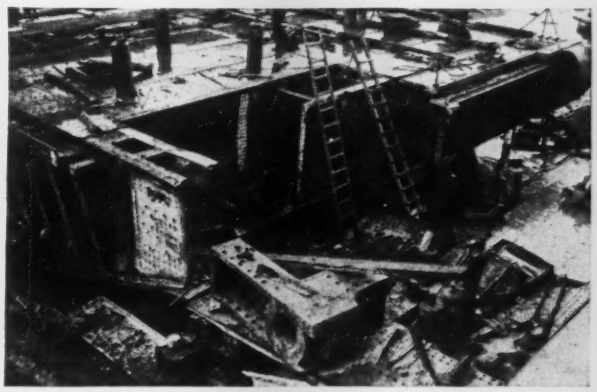


Fig. 6. South inner gate of lock entrance 1 in drydock. Badly damaged by demolition charges, its 2-ton bottom hinge is being removed for repair (left) while in the right view it is shown ready to be reinstalled.

building the 2-ton bottom hinge, requiring the making of several new pieces and the heating and straightening of the old ones (Fig. 6). It was a hard, meticulous job, requiring around-the-clock work in order to get the leaf back in service as soon as possible. Gifts of American cigarettes were found to be the best means of keeping the French civilian workers keyed up to the importance of the job, and it was completed in record time.

Fig. 7. Outer gate of lock entrance 1. The near or south leaf is a spare found in one of the harbor drydocks and put in temporary service here until the badly damaged original leaf can be repaired. The makeshift nature of the installation is obvious from the water that gets through the gates.

Fig. 8. Gate closing strut at outer gate of lock entrance 1 being reinstalled after repairs. In final position it will push against gate leaf at lower left. Top half of near timber end post of strut has been replaced with a steel plate post.

This leaf, however, was jinxed. Soon after being put back, a forged steel collar around the upper hinge pin broke, letting the gate drop forward. Quick work in shifting the center of gravity by admitting or expelling water from the proper ballast compartments of the leaf saved it from toppling completely over, and then, with the aid of heavy block and tackle and a 60-ton floating crane of the Transportation Corps, the gate was pulled back into position. There were many anxious moments though, for loss of this gate would have delayed opening the harbor by a month at least.

Actually the gate was out of service only 60 hr., thanks to the Army Engineer commanding officer who devised a scheme of replacing the forged collar with one flame-cut from a slab of 6-in. armor plate, and to the French company that did the job with an automatic oxy-acetylene cutting machine. Since, however, the flame case-hardened the manganese steel plate it could not be machined, so that as a bearing surface for the pin it is far from ideal. But it works and will continue to do so until a new forged and machined collar can be made.

The job of replacing the south outer gate also had its headaches. The gate was badly damaged by underwater demolition charges, but was still on its hinges. Its repair would take several months, but fortunately a gate that would fit the opening was found and this is now in temporary service (Fig. 7).

Two incidents involved in the replacement of this south outer gate are worth relating. In lifting it from its hinges the Navy salvage crew had to damage the gate closing strut, a heavy steel-reinforced timber frame that swings out from the lock walls on hinges, much like the gate leaf that it braces in closed position. The principal repair necessary was to replace the upper half of the timber post at one end (Fig. 8). No suitable timber being available (that in the strut being an African species known as greenheart, so hard that drill hole "shavings" are merely smooth sand-like particles), the Engineers devised an ingenious welded member

consisting of two plates spread apart by two lines of diagonal bracing as shown in Fig. 8. This not only made a strong column, but, by extending the plates top and bottom to lap over the timber members left in the strut, an effective bolted splice was easily developed.

The second incident revolved around the attempt to remove the spare leaf from where it was found, over to position in the outer gate of entrance 1. Since the gate to the drydock had been damaged so that it could not be opened, as large a hole as possible was cut in it so that the spare could be floated out. The first two attempts, however, failed after which it was decided to wait for the highest tide of the then current cycle. When that arrived, to make sure of success a 60-ton floating crane was run up to the outside of the drydock, boomed over as far as possible and, with four 1½-in. lines attached, raised the leaf 5 ft., reducing its draft to 27 ft. Then tugs pulled the crane away from the drydock, dragging the leaf through the hole in the gate. The leaf is now in service (Fig. 7) but will be replaced by the original leaf as soon as the extensive repairs necessary on it can be completed.

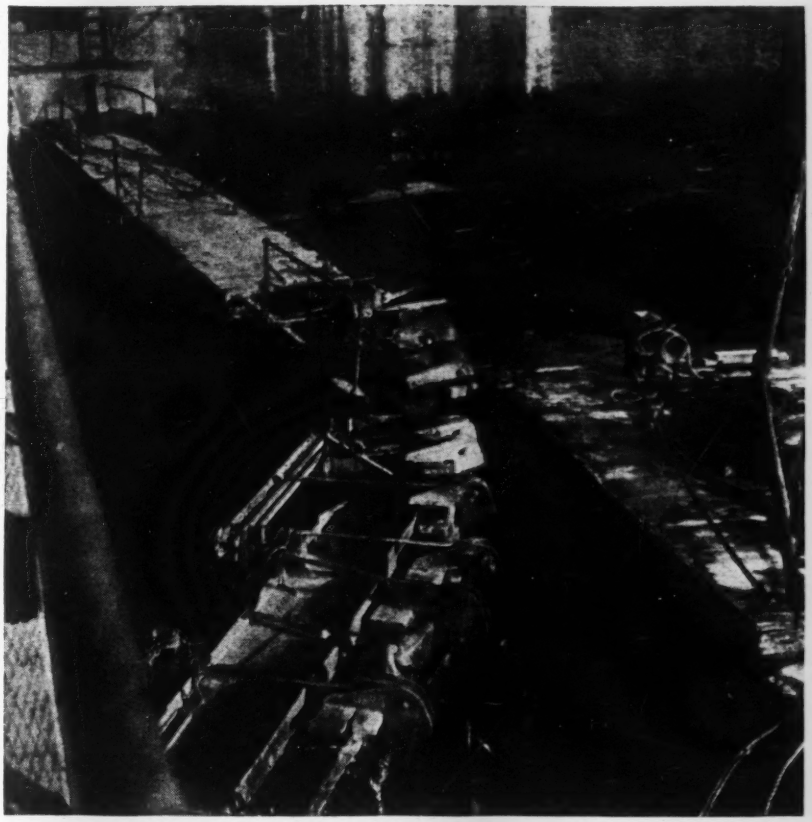


Fig. 9. Hooks on gate at entrance 2 from which a patch, 30 x 42 ft. in area, is suspended. A fill of rubble was also dumped behind the gate to hold bags of sand and cement against sill and around patch to increase water-tightness.

Gate repaired with 36-ton patch

Entrance 2, adjacent to entrance 1, was also essential to the functioning of the harbor as a series of wet docks, and the Germans damaged the two-leaf gate there accordingly. Apparently suspending a demolition charge about 10 ft. under water and on the centerline of the gate, where the two leaves came together, they had blown a hole 40 ft. wide and extending 20 ft. down from the top, half in one leaf, half in the other. The explosion had also ripped out much of the structural framing of the leaves so they could not be moved. The only possible method of repair was to make them tight with some kind of patch so that they could serve as dams.

The design worked out consisted of six 1-in. steel plates, stiffened with vertical strongbacks of I-beams, which were hung over the hole from heavy hooks cut out of armor plate as indicated in Fig. 9. The plates were installed one at a time, three over the hole in each leaf, and bolted together by drivers. The total patch

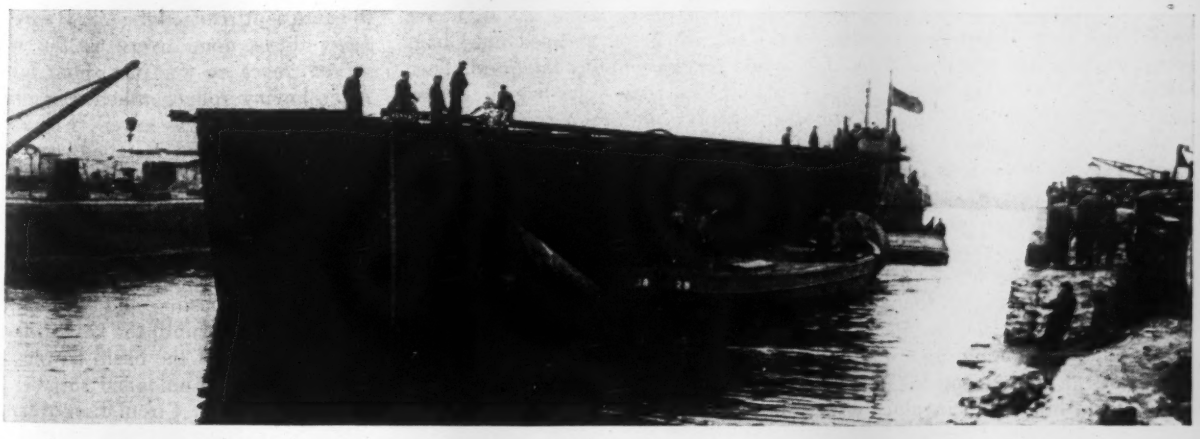


Fig. 10. An 800-ton roller type gate for lock entrance 15 is being towed out of drydock after repairs. Note the pontoons that reduce its draft.

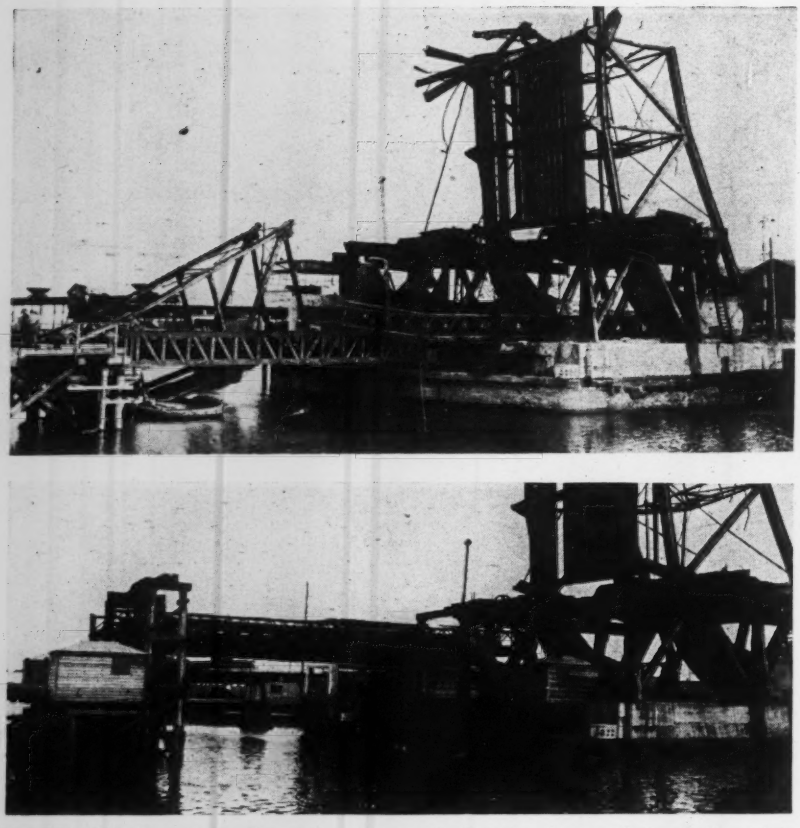


Fig. 11. At entrance 11, the railway span (top) is in place and the Bailey highway span is being launched. Both are on the alignment of the double-track Scherzer lift span which has rolled to a straight-up position under the load of its counterweight. The adjacent single-track lift span slopes into the water beyond the new railroad crossing. The lower view shows the same spans after being converted into lift bridges.

was then 30 ft. from top to bottom, 42 ft. wide and weighed 36 tons. The Engineers used a 10-ton stiffleg derdick mounted on a barge of Seabee pontoons to do the work.

To hold the patch tight against the gate leaves, it was then bolted through to the downstream face of the gates, where three tiers of box section members, made from pairs of 6-in. I-beams, were installed about 5 ft. apart vertically beginning at low water level. By passing the bolts through these horizontal members, the gate leaves were squeezed between them and the patch.

Even with this arrangement, however, too much water was lost through the gate, particularly at the sill. It was, therefore, decided to pack the cracks with bags containing a mixture of 10 percent cement and 90 percent sand, and to hold them in place with a 1,500-cu.yd. rubble fill piled up against the back of the gate. A total of 3,500 bags was required. They were first placed across the entrance against the upstream face of the gates at the sill by divers, after which the fill was dumped in by clamshell cranes, the material being allowed to assume its normal angle of repose.

When the fill reached the bottom of the patch plate, about 20 ft. above the sill, work was stopped until bags could be placed along this joint. Then the fill was resumed, as bags were progressively piled along the vertical joints at either side of the patch. The fill was carried up another 8 ft. in this manner, and then discontinued 12 ft. from the top of the gates so as not to overload them.

In addition to the big hole there were numerous small holes in these gates, which were repaired by patches resembling manhole or handhole covers in a steam boiler, *i.e.* a bolt coming through from the pressure side is pulled up tight against a strongback that spans the hole on the outside. When the holes were oblong the patch plate could be inserted from the downstream side at slack tide. If the hole happened to be round, however, this procedure was not possible, and divers had to place the patches from the upstream face. To aid them, a tapered timber plug shaped so that it could be driven tightly into the hole was fastened to each patch plate. When this plug was forced into a hole and the edges of the patch plate crimped down against the gate face a tight patch usually resulted.

Handling an 800-ton rolling gate

With one exception, the other gates in this synthetic harbor are considered to have been found to be operational. This exception was a gate at lock entrance 15 into basin I, and at the time we captured this particular port the gate was in drydock S awaiting repairs. As shown in Fig. 10, it was a huge box-like affair estimated to weigh 800 tons. Mounted on rollers when in place in the lock entrance, it was operated by being pulled back into a recess in the lock wall.

When found it lacked rollers, and to supply these it had to be taken to drydock N. But to get it out of drydock S was a problem since it drew 23 ft. of water even when flotation was increased by attaching steel pontoons. And even this gave only 8 in. of clearance over the sill at the best possible high tide. Due to difficulties in arranging the tow, this tide was missed, and a two weeks wait was necessary until the tide was once again high enough to give the 8 in. clearance. Actually it is claimed by the Engineers that if a strong wind had not suddenly blown up behind the gate as it reached the sill, it would never have gone over, as the observed clearance was just about 1 in. After having rollers attached in drydock N the gate was towed (Fig. 10) to entrance 15 and installed, permitting basin I to be put into service.

Replacing harbor bridges

Repair of the gates, however crudely, permits ships to move about through the basins and discharge their cargo. But until the key bridges across various of the basin entrances are restored, the unloaded shipments can go no farther. Circulation of land traffic as well as of water traffic is required to make a harbor work.

In the harbor of Fig. 2, all of the

bridges were wrecked by the Germans, usually by explosive charges that broke them enough so that they dropped into the water, thus helping also to block the basin entrance. One of the structures was a bob-tailed swing span of plate girder type at entrance 7, which was re-erected as a fixed-span, while the others were Scherzer rolling lifts, having huge overhead counterweights which fell across the roadway as blocks when the spans were cut loose. The rolling lifts could not be salvaged so that replacement bridges were the only solution.

Four locations, 8, 10, 11 and 12 were chosen for the replacement structures. Highway crossings on Bailey bridge spans were provided at all four locations and, in addition, a Unit Construction Railroad Bridge (UCRB) was put in at location 11.

The Bailey bridges at entrances 8, 10 and 12 were installed by the usual method of launching, that is by being assembled on the bank and then pushed across as a cantilever. Bridges 8 and 10 were relatively small, only 70-foot span, but bridge 12 had a 120-ft. span and was of "triple, single" makeup, that is having a single tier of three parallel trusses at either side of the roadway. It was assembled and installed in 4½ hr. at night after the big job of removing the wreckage of the old span had been completed.

This removal operation had involved dragging nearly the whole span out of the water in one piece, and would not have been too difficult, despite the 240-ton weight, except that after about half of the span was on shore the other half did not remain horizontal, as had been hoped it would, but bent down, fouling the abutment. Even the two D-8 tractors, pulling 120 tons each through a 6-part, 1-in. line, and aided by two 10-ton hoists on 8-part, ⅝-in. lines, could not move the load. It then became necessary to pick the sagging end up onto a crib until a floorbeam cleared the wall, then pull the structure until the next floorbeam fouled, and repeat the process. In spite of these delays, however, the wreckage was removed much faster than if an attempt had been made to break it into pieces small enough for a crane to handle.

The bridge situation at location 11 presented much more of an engineering and construction problem than at the other three locations. In the first place, both railroad and highway crossings were required. Second, they were vital to the operation of the port, and they had to be built—and were built—in nine days. And third, very soon after they went into service it was required that they be converted to lift spans to permit larger craft to pass between basin F and basin I.

The original bridges at the location were two 120-ft. span Scherzer rolling lifts, set side by side, one carrying double track, the other single track. It was decided to install both the railway and the highway spans in the alignment of the original double track bridge because it was wide enough to accommodate them (Fig. 11) and also because its wreckage was more easily pulled out of the water than was that of the companion structure.

A 75-ft. Bailey double-single span and an 80-ft. UCRB were installed, the remainder of the 120-ft. opening being filled with a timber pile trestle. The Bailey was launched into position with the usual lightweight temporary nose on the end that engages the far support in time to keep the span itself

Fig. 12. Trusses of the railroad span at entrance 11 were "passed across" the opening by 30-ton crawler cranes on either side.

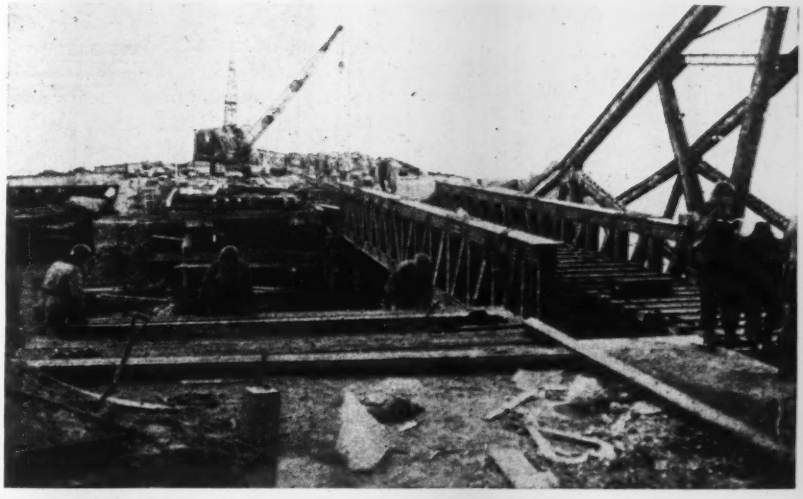


Fig. 13. The railroad span at entrance 11 is shown at the right as it neared completion. In the foreground, preparations are being made to launch the Bailey span beside it.

from being overextended as a cantilever. The UCRB, however, was not launched as a complete span, but was installed a truss at a time with two 30-ton crawler cranes, one on each bank.

The procedure was to assemble a truss on one side, hook the falls of a crane to its outer end, and boom down as far as was safe thus pushing the truss out toward the other side. As soon as possible (Fig. 12) the far side crane picked up the outer end of the truss while the attachments from the near side were moved back toward the near end. Then as the far side crane boomed up the truss was brought to its far side support. Floorbeams, ties and track were filled in, and the bridge was complete (Fig. 13).

When the order came to convert the spans into lift bridges, the magnitude of the job practically doubled, for the necessary gantry frames and hoist platforms at either end were sizeable structures and had to be supported on additional pile substructure (Fig. 11 bottom). Each gantry frame consisted of three timber legs (one on each side of the bridges and one between them) carrying a steel girder cross member to which the lifting blocks over the trusses were attached. A 4-ton gasoline-engine driven hoist at each end of each bridge furnished the power to raise the 35-ton UCRB or the 20-ton Bailey through a 13-ft. lift in about 4 min.

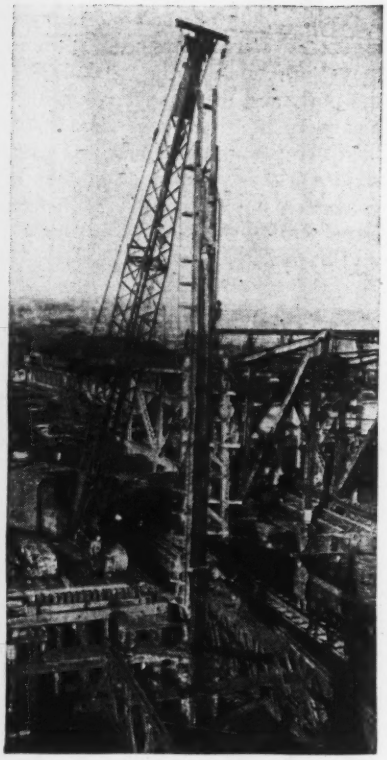


Fig. 14. Driving wood piles for support of gantry frame at entrance 11. Note special hanging device for lowering leads without booming down, developed and made by the 1055th Engineer P.C.&R. Group.

The cable reeving arrangement, involving the use of a deadman about 100 ft. back from the bridge, toward which a running block attached to the bridge-lifting cables was pulled by the hoists, is shown in Fig. 1.

With basin gates repaired and essential bridges replaced, this harbor, which encompasses several different harbors, is working again despite its recent war-wrecked state. The results are a tribute to the ingenuity, speed, mechanical inventiveness and perseverance of American engineers and construction men, and to the remarkable efficiency and ruggedness of American construction machinery. All these, though, are only succeeding in patching up the harbors with temporary facilities. What must be done by the European countries themselves to effect permanent reconstruction of their war-wrecked harbors is vast beyond belief, and will require a score of years at least.

The specific construction operations described in this article were carried out by three different Army Engineer units, the 373rd Engineer General Service Regiment, commanded by Col. Frank F. Bell, in peacetime a partner in the Uvalde Construction Co., of Dallas, Texas; the 1055th Port Construction and Repair Group commanded by Lt. Col. Elmer H. Oechsle, formerly engineer for the Widmer Engineering Co., of St. Louis; and the 1061st Port Construction and Repair Group commanded by Lt. Col. W. P. Moss, who before the war operated a marine dredging company on Long Island.

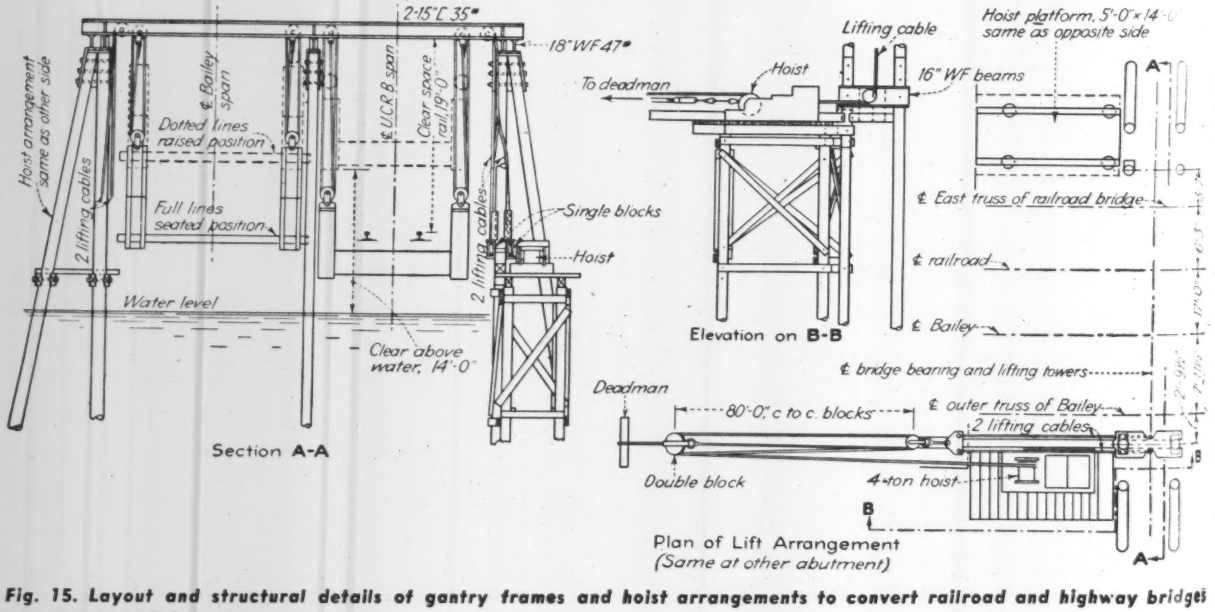


Fig. 15. Layout and structural details of gantry frames and hoist arrangements to convert railroad and highway bridges at entrance 11 into lift spans.

What is a Fair Charge for Handling Industrial Wastes in Municipal Plants?

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***Contents in Brief**—Many municipalities are faced with the prospect of developing a rate structure by means of which an equitable charge can be made for disposal of liquid industrial wastes. Such wastes generally are more difficult to treat than is domestic sewage and sometimes they are so large in volume or of such a character that additional disposal plant facilities are required. Mr. Besselievre suggests a basis for rate-making and provides some unit costs reflecting experience at 30 municipal plants.*

THE QUESTION of whether or not a city should handle the wastes of any or all industrial plants, of whatever type, in its municipal sewers and sewage treatment plant is an important one.

Pertinent factors related to this question are: Practicability, policy, expediency and justice. Many cities unwisely have agreed to handle, without cost, the wastes of all industries coming within their environs. Obviously this is not proper since it places an undue burden on the citizens of the city to provide much larger disposal facilities than normally would have been necessary, and also to assume a greater expense for their operation. However, it is just as improper to presume that industries must treat their own wastes so that only the equivalent of clear water is discharged into the sewer.

Sometimes a city, in the urge to encourage industrial development, agrees to handle the wastes from given industries. Before such commitments are made, careful investigation of the character, volume and strength of the wastes should be made. The wastes may be of a character that will compel the city to build and operate an expensive, complex plant. The amount of revenue brought to a city by an industry in taxes and increased population may not exceed the extra cost to the city for treatment of such wastes. In this case the city has gained little or nothing.

In the smaller cities it frequently happens that a single industry provides the major source of employment and thus supplies practically all of the money circulating in that town. It may be deemed expedient by the city officials to accept the burden of treating the industry's wastes on the theory that the industry, through the taxes it pays and through distribution of wages, provides most of the city's income. This may or may not represent a sound attitude.

Generally, there can be no justification for a city to arbitrarily agree to handle the wastes from an industry if this will entail considerable expense for new construction or for operation. Some agreement should be sought whereby the industry is bound not to discharge a liquid waste to the city sewers that is more difficult to treat than the normal, domestic sewage. This applies particularly in large cities which embrace many and diverse industries whose effluents have no other outlets than the city sewers.

What can be done

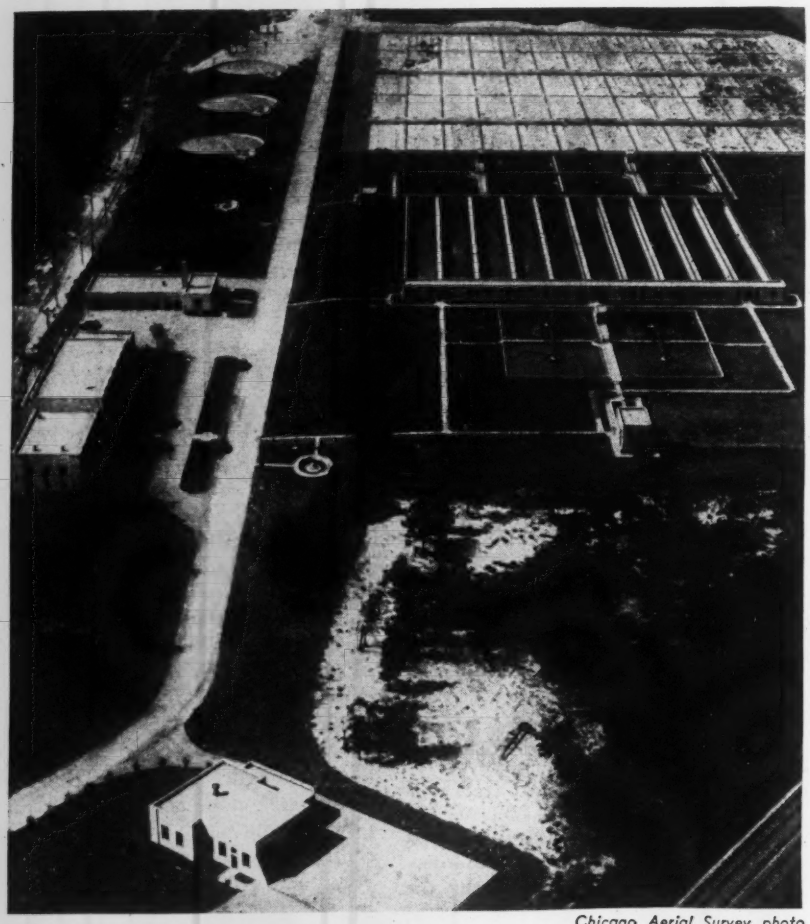
This discussion seeks to outline ways and means of arriving at an equitable basis of charges to be made for the cost of handling industrial wastes that are discharged through the municipal sewage disposal system.

Volume alone is not a correct basis for such a charge. Many plants discharge large volumes of liquid waste that contain a small amount of solid matter and have a low biochemical oxygen demand (B.O.D.). Other plants may discharge a relatively small volume of waste that contains a high percentage of organic matter, or which has a high B.O.D. The latter puts much more of a load and expense on the city treatment facilities than a waste of greater volume but lesser strength. Therefore, if a volume charge alone is made, the industry with the small volume of high-centration waste will be unduly favored and will pay less in proportion to the treatment expense involved than the industry having large volume, low-concentration waste, whereas the reverse should be the case.

The dual function of a sewage treatment plant is to remove the suspended solids and to reduce the B.O.D. of the liquid wastes. The size of the plant and the units for handling suspended solids and B.O.D. are directly related to the total amounts of these constituents in the sewage when it finally reaches the plant.

It would seem advisable, therefore, and more equitable for all parties concerned—regardless of the specific type of treatment plant required—that a charge be made against the industry on the basis of suspended solids and B.O.D. contributed to the sewage reaching the plant. Thus, regardless of its volume, it is the strength and character of the waste that should govern in making a charge for services rendered.

Logically, the established rate for handling industrial wastes should be related to the cost per million gallons of sewage treated at the disposal



Chicago Aerial Survey photo

Capacity determination and sometimes processing methods for municipal sewage disposal plants reflect the amount and type of liquid industrial wastes that must be handled along with domestic sewage. Hence the growing demand by municipalities that industries assume a share of treatment plant costs. The 40 mgd. activated sludge plant at Gary, Ind. is shown above.

plant. This rate should include a proportionate part of the fixed charges as well as the actual operating costs.

Since a treatment plant is normally designed to handle sewage with a relatively low suspended solids and B.O.D. content as compared to most industrial wastes, there are two suggested ways of establishing an industrial charge.

Theory of rate establishment

One method is to ascertain the normal suspended solids and B.O.D. content of the domestic sewage as well as that of the industrial wastes. If these are measured in terms of parts per million (or pounds per million gallons) then the charge to industry might be based on units of parts per million (or pounds per million gallons) by which the industrial waste exceeds the same constituents of the normal domestic sewage.

This provides a method whereby that portion of the industrial waste up to the normal strength of the city sewage can be handled without charge and the industry pays for only the excess strength contributed. Thus, if the normal sewage has a suspended solids content of 275 ppm. and a B.O.D. of 300 ppm. and an industrial waste has a suspended solids content of 400 ppm. and B.O.D. of 800 ppm., then the industry would be charged on the basis of contributing 125 ppm. of suspended solids and 500 ppm. of B.O.D.

With plant operating costs available giving the average cost per million gallons treated, coupled with information of the average amount of suspended solids and B.O.D. removed from the city sewage, and with knowledge of suspended solids and B.O.D. of the industrial waste to be treated, a charge can then be established for handling the excess in the industrial waste.

Buffalo's rate formula

It is interesting to note that the officials of the city of Buffalo, N. Y., (*Sewage Works Engineering*, Oct. 1944, p. 543) have worked out an interesting but formidable-looking formula for basing charges to industry, which carries out the above theory in some respects. This formula is:

$$R = F P_c (C - N_c) + F P_s (S - N_s)$$

Where

R = Rate of special charge for each 1,000 cu. ft. of waste.
F = Factor to convert from ppm. to pounds per 1,000 cu. ft. (Note: This factor is 0.0622)
P_c = Cost of chlorine.
C = Measured chlorine demand of the waste.
N_c = Normal chlorine demand of Buffalo sewage.
S = Measured quantity of suspended solids in the waste.
N_s = Normal quantity of suspended solids in the Buffalo sewage.
P_s = Cost of chemicals and power as determined from plant operation.

The Buffalo method gives no recognition to the B.O.D. load imposed on the treatment work and makes no charge for the excess of this constituent.

Another method of charging for handling industrial wastes is to assess the industry for the entire amount of suspended solids and B.O.D. contributed in its wastes, and make a charge for each, regardless of the strength of the city sewage. Thus the industry is charged for the handling of its wastes without the city assuming part of the financial burden but providing all the facilities for treatment. Which of these two methods is the most equitable for a particular situation calls for consideration of many factors.

New Brunswick's rate formula

New Brunswick, N. J. has adopted a charge system based on this second method. (See *ENR* April 20, 1944, vol. p. 554.) Here it is provided that each industry contributing its wastes to the sewer and sewage treatment plant pays the following: $22.00 for each million gallons of flow contributed; $5.00 for each ton of solids in the waste; and $5.00 for each 100 lb.

of chlorine demand exerted by the wastes. Also, the industries must minimize peak concentrations, in other words, iron out peak flows, and produce wastes of acceptable quality by the installation of equalizing tanks or pre-treatment.

It will be noted that New Brunswick makes a charge for volume as well as for solids load, but no charge is made for B.O.D. loading. This is not a method applicable for all wastes and all cities, as some wastes are low in solids but high in B.O.D.

Both of the methods outlined above require periodical analyses of the industrial wastes and city sewage to determine the amounts of suspended solids, and a measuring device to determine the volumes of wastes. The city authorities usually make these determinations on domestic sewage as a routine matter and it is possible that it would make the same determinations for the local industries at a small charge.

To illustrate how a charge based on 100 lb. units of suspended solids and B.O.D. works out, the writer has prepared the attached tabulation. This assembles data from 30 plants on the costs of operation and the cost of removal of units of 100 lb. of suspended solids and B.O.D. in these plants; all based on published information. It is interesting to note the following average figures obtained from these data:

Cost of operation per m.g. treated	$16.78
B.O.D. removed (ppm.)	168.41
B.O.D. removed (lb.)	1,404.51
No. of 100 lb. units of B.O.D. removed	14.05
Cost of removal per unit of B.O.D.	$1.72
Sus. solids removed (ppm.)	203.30
Sus. solids removed (lb.)	1,697.23
No. of 100 lb. units of sus. solids removed	16.97
Cost of removal per unit of sus. solids	$1.10

It is a moot question whether or not an industry should be required to pre-treat its wastes to some extent before discharge into the sewers. As specified in New Brunswick, the peaks of flow should be smoothed out. Many industries discharge large batches of wastes periodically and at high rates. If these flows go directly to the treatment plant they put a greater load on the plant facilities than if they arrived gradually over a period of hours. Tanks to hold the waste for continuous release into the sewer over a 24 hr. period seems to be a logical requirement in such cases.

Also, many industries discharge a highly acid waste at some periods, and at other times a highly alkaline waste. If these wastes reach the treatment plant in concentrated form they may easily upset operation, particularly that of biological processes. In such cases equalization tanks should be provided so that these wastes may be mixed and allowed to mutually neutralize each other. While almost any process of sewage treatment can be regulated to absorb con-

SEWAGE TREATMENT PLANT OPERATING COSTS RELATED TO REMOVAL OF BIOCHEMICAL OXYGEN DEMAND AND SUSPENDED SOLIDS

			Biochemical Oxygen Demand—ppm.						Suspended Solids—ppm.					
Plant Location	Type of plant (See key below)	Cost operation per m.g.	Raw sewage	Effluent	ppm. removed per m.g.	lb. removed per m.g.	No. of 100 lb. units removed	Cost per unit removed	Raw sewage	Effluent	ppm. removed per m.g.	lb. removed per m.g.	No. of 100 lb. units removed	Cost per unit removed
Rockville Center, N. Y.	Ac.S.	$59.68	288	41	247	2,060	20.6	$2.90	234	25	209	1,743	17.43	$3.42
Hartford, Conn.	S&D	14.90	137	119	18	150.1	1.5	9.92	117	25	92	767.3	7.67	1.94
Anderson, Ind.	Gugg.	17.73	157	13	144	1,200	12.0	1.47	233	26	207	1,726	17.26	1.02
Jackson, Mich.	Ac.S.	18.73	122	7	115	959.1	9.59	1.95	191	17	174	1,451	14.51	1.30
Marion, Ind.	Ac.S.	16.57	145	9	136	1,134	11.34	1.46	241	12	229	1,849.8	18.49	0.90
Minneapolis-St. Paul.	SDM	9.90	175	105	70	584	5.84	1.70	290	100	190	1,584.6	15.85	0.62
Gary, Ind.	Ac.S.	8.79	132.7	7.2	125.5	1,047	10.47	0.84	228.8	5.9	222.9	1,859	18.59	0.47
Galesburg, Ill.	Tr.F.	15.94	165	30	135	1,126	11.26	1.42	193	32	161	1,343	13.43	1.18
Elizabeth, N. J.	S&Bg.	7.91	240	143	97	809	8.09	0.97	194	64	130	1,084	10.84	0.73
Aurora, Ill.	SDTF	11.97	123	16	107	892	8.92	1.36	175	28	147	1,226	12.26	0.97
San Bernardino, Cal.	SDTF	8.98	170	6	164	1,368	13.68	0.65	.....	.....	.....	.....	.....	.....
Findlay, Ohio	Ac.S.	28.14	405	21	384	3,203	32.03	0.88	427	11	406	3,386	33.86	0.83
Pasadena, Calif.	Ac.S.	19.86	149	13.2	135.8	1,133	11.33	1.75	303	27	276	2,303	23.02	0.86
Muskegon Hts., Mich.	Ac.S.	33.20	357	9	348	2,902	29.02	1.05	305	6	299	2,493.6	24.94	1.33
Springfield, Ill.	Ac.S.	15.28	203	13	190	1,584.6	15.86	0.97	199	10	189	1,576.3	15.76	0.97
Belvedere, Ill.	Ac.S.	21.64	201	10	191	1,593	15.93	1.36	198	6	192	1,601	16.01	1.35
Chicago Hts., Ill.	Ac.S.	16.33	236	16	220	1,835	18.35	0.89	320	20	300	2,502	25.02	0.65
Decatur, Ill.	SDTF	7.12	199	24	175	1,459.5	14.59	0.49	209	37	172	1,434	14.34	0.49
Elgin, Ill.	SDTF	13.79	123	34	89	742.3	7.42	1.86	196	27	169	1,409.5	14.09	0.98
Urbana-Champaign, Ill.	SDTF	16.11	314	28	286	2,385	23.85	0.67	211	33	202	1,685	16.85	0.82
Danville, Ill.	CP	15.73	185	87	98	817.3	8.17	1.92	148	58	90	760.6	7.61	2.07
Waukegan, Ill.	CP	19.22	195	95	100	834	8.34	2.31	201	50	151	1,259	12.59	1.53
DeKalb, Ill.	SDTF	11.57	256	19	237	1,977	19.77	0.58	285	22	263	2,193	21.93	0.52
Washington, D. C.	S&D	4.39	171	117	54	450.3	4.50	0.97	180	89	91	759	7.59	0.58
Ft. Dodge, Iowa	SDTF	27.94	825	74	751	6,263.3	62.63	0.44	616	59	557	4,645	46.45	0.60
Masillon, Ohio	S&D	15.65	151	77	74	617.2	6.17	2.50	244	86	158	1,318	13.18	1.18
Buffalo, N. Y.	S&D	8.25	127	101	26	216.8	2.17	3.80	168	110	58	484	4.84	1.78
Cleveland, O. South'ly	STFMD	9.39	204	51	153	1,276	12.76	0.73	270	37	233	1,943	19.43	0.48
" " East'ly	Ac.S.	16.26	130	11.1	118.9	991.6	9.91	1.64	238	12.5	225.5	1,881	18.81	0.86
" " West'ly	SD	12.41	245	182	63	525	5.25	2.36	262	160	102	851	8.51	1.46

Key to Symbols of Types of Plants.

Ac.S. = Activated Sludge
S & D = Sedimentation and separate digestion.
Gugg. = Guggenheim process.
S.D.M. = Sedimentation—digestion—magnetite filters.
Tr. F. = Trickling filters.
S & Bg = Sedimentation and barging to sea.
SDTF = Separate digestion with trickling filters.
CP = Chemical precipitation.

tinuous high concentrations of acids or alkalies, the entire process may be put out of action and plant operation seriously affected if these concentrations change markedly over the day.

One school of thought holds that industry should be charged for the handling of its wastes by one of the several methods suggested herein, but that it should receive credit for such charges against the taxes it pays to the local municipality. This is based on the theory that the industry is supporting all agencies of the city the same as any citizen and is therefore entitled to the use of all services and utilities normally provided for the citizens. This, too, is a moot point.

In this discussion of some of the factors related to the question of handling industrial wastes in municipal treatment sewage plants it becomes readily apparent that no general rule or formula for charges can be established for all cases. Each case must be considered separately by all the parties concerned, with the addition of a skilled engineer or consultant acting impartially to weigh all the factors and work out a solution mutually agreeable and economically feasible.

Prefabrication is the Basis Of Emergency Housing in Russia

"In the next ten years" says Professor Alabyan, vice-president of the Academy of Architecture, who is in charge of replanning Stalingrad, "we shall have built a billion square meters of living space, or roughly 25 million houses. The Academy of Architecture, along with the Commissariat of Building, is now preparing a gigantic planning scheme which will cover the whole USSR. Haphazard building is useless. We must tackle the problem from the beginning, which means starting by building factories to produce building materials.

"In every large region we propose to establish Combinats—groups of factories producing bricks, cement, glass, paint, waterpipes, sewerpipes, nails, plumbing fixtures and prefabricated parts such as walls, doors, and window-frames. First, of course, we shall have to make machine tools to produce building materials to construct houses. The establishment of these Combinats will take time, but even if there were no house building at all for the first two or three years, we would still save time in the end. We shall economize in workmen, too, for when industrial methods are used housebuilding requires less labor in general, and also less skilled labor."

According to a report from the USSR correspondent of the *New Statesman and Nation*, London, condensed from the issue of March 24, 1945, a government committee on architecture now covers the whole Soviet Union, with 214 planning organizations employing more than 1,000 architects. Building plans for 140 towns were drawn up last year, and 315 more plans will be completed in 1945. In every republic new architectural schools, from higher technical institutions to vocational schools for training in exterior and interior decoration, are also opening this year. Throughout the liberated areas courses are established to train builders to make up for the scarcity of skilled workers. Stalingrad has 35,000 of these part-time or full-time volunteers.

Emergency housing

In the midst of the long-term building plans, the government has made a concession to the urgency of housing needs in the shape of prefabricated wooden houses, with a lifetime of about 15 years. These frame cottages on brick foundations will account for 10 to 15 percent of the total housing plan.

Pioneers of Russian prefabrication were the Building Trust of the Commissariat of Aviation Industry, who were obliged to build in the shortest possible time large numbers of houses for skilled workers evacuated to the Urals. In view of its previous experience, the Aviation Industry's help was called in when the population started pouring back into Stalingrad. Six hundred families of the executives and best workers of the "Red October" factory in Stalingrad are now rehoused in bungalows built in record time by the Aviation Building Trust Shock Brigades. One of these prefabricated houses has been erected in the neighborhood of Moscow for inspection by the other Commissariats which are expected to take up the idea and start producing the necessary parts in their own factories.

Prefabricated houses have come to stay in the USSR. Many have already been erected in Moscow, Stalingrad, Kiev, Smolensk and other Soviet cities. For example, there is the Pavlov house—named for its designer V. J. Pavlov—erected in October 1944, in Podkipki, an industrial area near Moscow. The job was done by 40 workmen, including 12 carpenters, two bricklayers, two electricians, two plumbers and three painters. The rest were unskilled laborers.

Apart from the 11,200 bricks used for the foundations (the Russian climate calls for solid foundations) and the Dutch stove, all components of the Pavlov houses are prefabricated. The outside walls consist of prefabricated wooden frames filled with a mixture of sawdust and lime for heat insullation. Internal partitions, ceilings and floors are also made of prefabricated frames. The main material of construction is wood. Parts are delivered to the site ready to be assembled with the aid of a mobile crane and a few gangplanks.

The job takes 742 cu.ft. of timber, 1,500 sq. ft. of artificial slates, 258 sq. ft. of glass, and about two hundredweight of nails. The building covers an area of 969 sq. ft., and has a total capacity of 11,225 cu.ft. It will accommodate a family of four or five.

Pavlov houses are going up by the hundreds in the former war zone. Over 700 have already risen on the ruins of the workers' settlement of the Krasny Oktyabr plant in Stalingrad. The People's Commissariat of the Aircraft Industry has adopted the Pavlov house for its big rebuilding plan in the city proper. Parts were prefabricated in the Urals, and trained teams of builders and supervising engineers also came from there. Some 20 factories producing standard parts for Pavlov houses have been opened recently, and more are being built. The entire operation of building the specimen Pavlov house in Moscow has been made into a film copies of which have been sent to housing committees throughout the USSR.

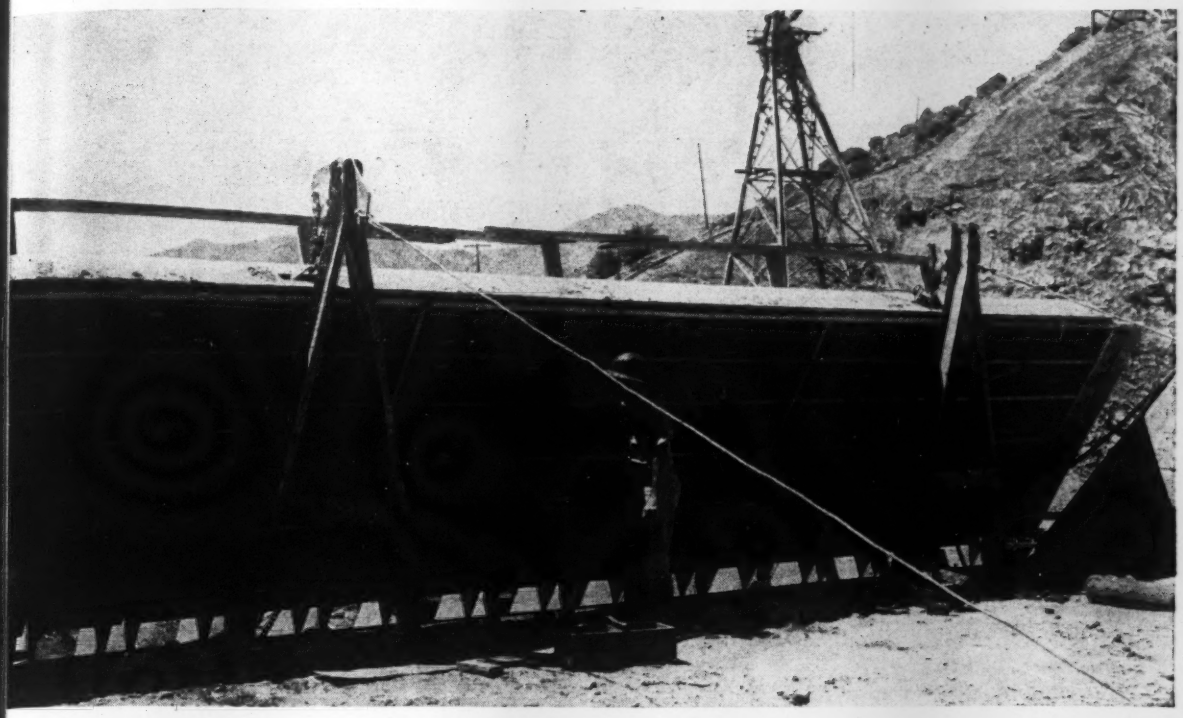


Fig. 1. Regular cantilever form was adopted to vacuum processing by making small suction chambers on the face.

Vacuum Processing of Shasta Dam Spillway

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***Contents in Brief**—Excess water and entrapped air was removed from the surface of the concrete of Shasta Dam spillway to densify and increase its hardness and resistance to wear. Approximately 0.58 lb. of water per sq. ft. of surface was removed by the vacuum process at a cost of 20 cents. Vacuum chambers, built on the face of panel forms, were made in small units so that processing could follow closely behind the placing.*

HIGH VELOCITY and the tremendous energy developed by 200,000 sec.-ft. of water falling 487 ft. over the spillway of Shasta Dam dictated utmost care in construction to secure a surface highly resistant to wear. Such a surface on the concrete was obtained by removing excess water and entrapped air by vacuum suction after the concrete was placed.

An average of 0.58 lb. of water was extracted from each square foot of surface processed at a cost of 20 cents. As a result of the lowered water-cement ratio, a smooth, dense and substantially improved concrete surface was produced. The indicated compressive strength of the vacuumed concrete surface was found by tests to be 2.6 times greater than that of concrete placed against a wood form. The strength indication was obtained by the "Ball impact" test (U. S. Bureau of Reclamation Manual p. 329) and by comparative resistance to sand blast.

Suction, induced by vacuum, was applied uniformily over the surface of the concrete through a system of porous chambers constructed on the face of the cantilever type, wood panel forms used for the dam. The 50-ft. long regular form panels for a 5-ft. lift, measuring 6.4 ft. along the slope, were divided into five tiers of five 10-ft. chambers each. This made it possible to immediately apply suction to the concrete surface as placement of concrete against the forms progressed.

Vacuum mats built on form

The surface of the forms was divided into chambers by ¼-in. by 2-in. plywood strips, sealed to the form with asphaltic compound. Inside each chamber an air space was formed by a layer of heavy base wire covered with a layer of fly screen, both nailed to the form lagging.

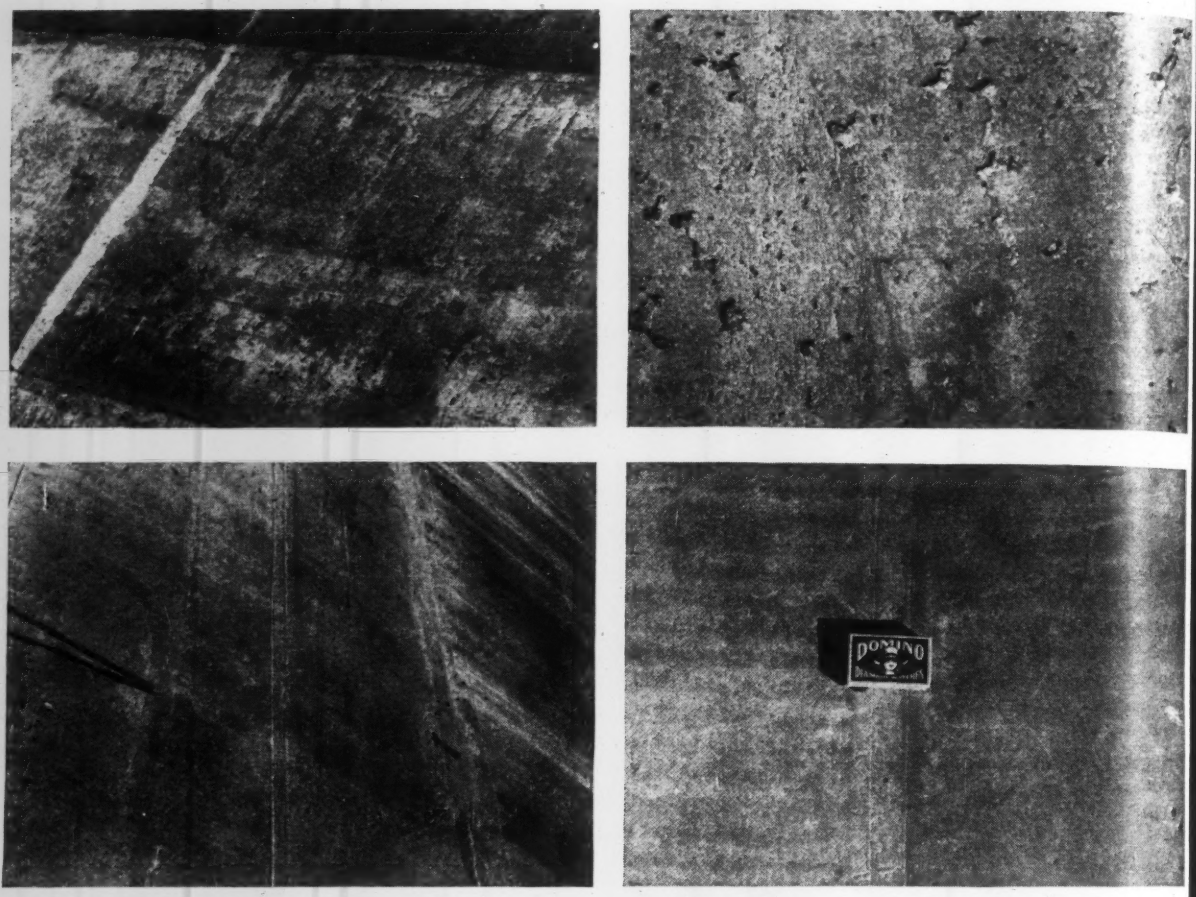

Fig. 2. Concrete placed against a wood formed surface on an 0.8:1 slope, shown above. Concrete below is vacuum treated. Note marks of horizontal sealing strips on vacuum processed concrete.

Standard metal lath and No. 4 mesh screen or hardware cloth, made with 16-gage wire, were used for the base material with equal success. Lath was cheaper, easier to handle and was more practical on forms to be used only once or twice. The No. 4 mesh screen was more substantial and more economical on panels that were to be used repeatedly. The entire face of the form was covered with a "filter cloth" of unbleached muslin having 64 by 64 threads per inch, stapled to the top and bottom of the form.

On the outside of the form, standard ¾-in. pipe nipples were threaded through the 2-in. form lagging at the bottom center of each chamber. This opening served as the vacuum inlet and also as the outlet for evacuated water and air.

Muslin was unfastened from the form and allowed to adhere to the concrete surface when the forms were raised. While the form was hanging on the raising jacks or A-frames, the base screens were washed clean with an air and water jet and a new cloth was tacked on for the next lift. The old cloth was removed from the concrete surface, hung over the hand rail on the back of the form, washed with a water jet and saved for reuse. The cloth served for an average of two uses.

Reciprocating type compressor used

For processing the spillway concrete, the required vacuum was produced by a reciprocating type compressor with a rated capacity of 800 cfm. located in a fixed position on the left abutment downstream from the dam. It was used to process the entire area of the spillway formed by the gravity section of the structure, the suction being transmitted to the forms through a 2-in. dia. standard pipe extending from the pump to the lowest elevation of the spillway, then up the face to a horizontal section extending the width of the spillway. The horizontal section was raised and the vertical line was extended as the concrete in the dam increased in height.

A rubber hose connected the pipe line to receiving tanks on the back of the forms, which were used to catch and measure water withdrawn from each block of concrete (Fig. 3). A section of hose connected the tanks to a standard pipe manifold on the back of the form.

Short 1-in. dia. nipples were welded at intervals along the length of the manifold on the form and sections of suction hose 12 ft. long connected the nipples on the manifold to nipples threaded in the form lagging, thus completing the service line from the pump to the vacuum chambers, a maximum total distance of 1,300 ft. Rubber crutch-tips closed the individual nipples on the manifold when suction to them was not desired. It was possible to maintain a vacuum of between 15 and 20 in. of mercury with as many as ten of the chambers being processed at one time.

Use of the vacuum process did not necessitate any changes in the con-

crete mixes or methods of placing from what normally would have been used to construct the spillway section. The regular mass concrete mix with proportions of 1:9.6 contained 6-in. maximum size aggregate and 1 bbl. of cement per cubic yard of concrete. Concrete had a water-cement ratio of 0.60 and an average slump of 2¼ in. Where the slope was flat, at the lower elevations of the spillway and in reinforced-outlet sections, it was necessary to use a more plastic mix, containing smaller maximum size aggregates.

Concrete was delivered by cableway, deposited directly into place from the bucket and compacted with internal vibrators. As soon as enough concrete was compacted against the form to cover one chamber the vacuum was applied to that chamber. After a short time, usually 5 or 10 min. the concrete near the face was re-vibrated while the suction remained on the form. The suction was turned off shortly after the second vibration, making the total processing time approximately 20 min.

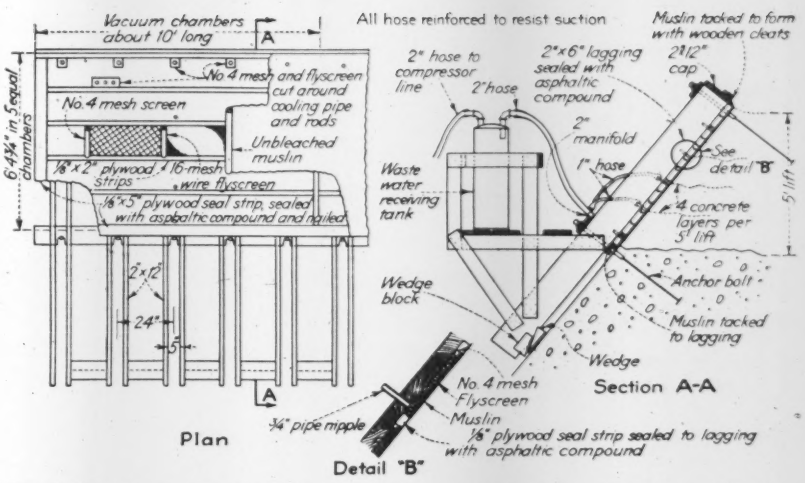

Fig. 3. Vacuum mats were built on cantilever panel forms. Muslin covering was released, then removed separately after panel was raised.

Movable vacuum mats on apron

Forms were not required for the apron of the dam downstream from the gravity section and vacuum processing was done with readily movable mats applied to the surface after it had been shaped to line and grade by usual methods. The concrete placed for the apron surface was made of 3-in. maximum size aggregate and 1.21 bbl. of cement per cubic yard. The concrete had mix proportions of 1:7.5, a water cement ratio of 0.60 and an average slump of 3 in. Concrete was deposited directly in place from the cableway bucket, vibrated, screened to correct grade and "bull floated."

Mats used for processing the apron were 3 by 4 ft. in size and made with ⅜-in. plywood, hardware cloth for base wire, fly screen and cloth attached to the base. A piece of 1-in. angle around the edge of the mat reinforced the plywood and prevented warping, Fig. 4. A strip of rubberized cloth around the perimeter of the mat provided a 1-in. flap that could be pressed slightly into the concrete to effect a better seal.

The vacuum line was attached to a nipple and floor flange fitted over a hole drilled in the center of the mat. Vacuum hose, 1 in. in diameter connected the individual mat to a 2-in. dia. pipe manifold and thence to the vacuum pump, located near the block and not over 200 ft. away.

The vacuum pump used for this processing of individual blocks was of the rotary type, with a rated capacity of 1,100 cu. ft. per min., mounted on a 1½-ton truck, and operated by the truck motor through a power take-off. In addition to the vacuum pump, the truck carried water receiving tanks. The unit was capable of processing about 350 sq. ft. of surface at one time.

Vacuum suction was kept on the mats for 30 to 60 min. depending on the weather, the condition of the concrete and the like. After the vacuum had been on for a few seconds, the pressure from the atmosphere pressed the mats firmly on the surface and it was possible to walk over the mat to place additional mats in advance positions. When processing on a hot day, it was imperative that mats be placed on the surface of the concrete at the earliest possible time as delays might permit the surface to become hard or dry, with consequent difficulty in

Fig. 4. The spillway apron floor was processed with 3x4-ft. mats, moved ahead as concrete progressed. The compactor float was used to work out the ridges between mats. Final finish was made with steel trowles.

Fig. 5. A truck-mounted compressor of 1,100-cfm. capacity created the vacuum for processing the apron of the spillway.

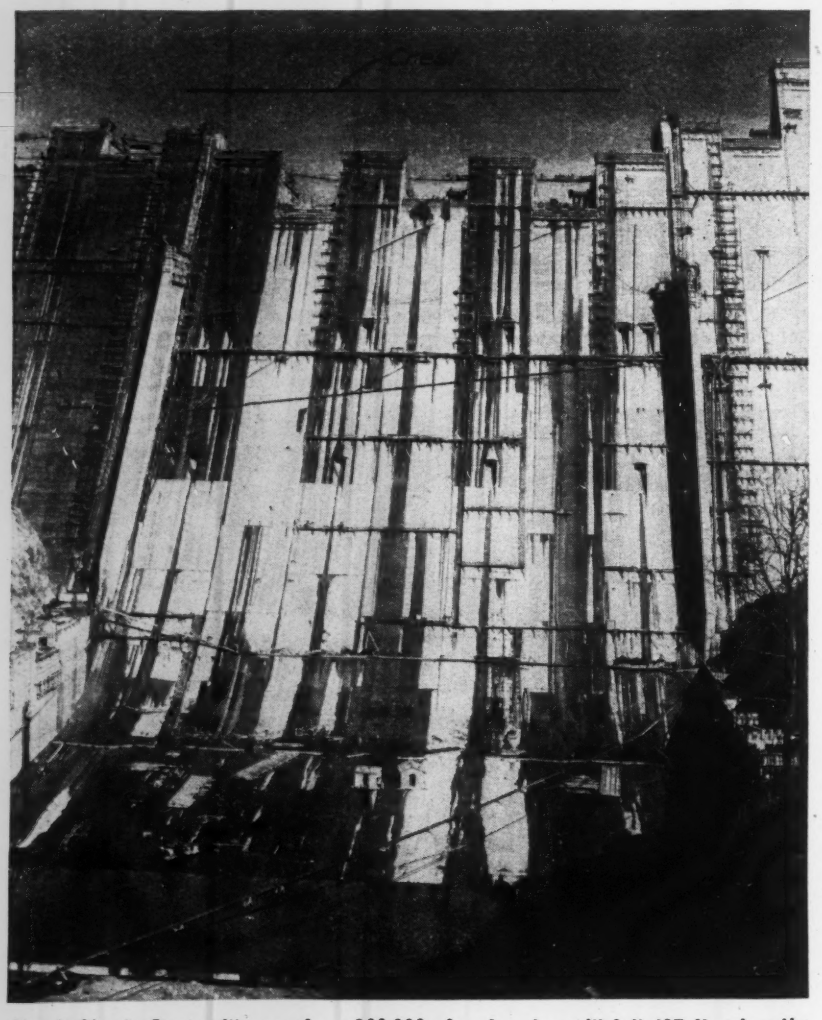

Fig. 6. Shasta Dam spillway where 200,000 cfs. of water will fall 487 ft. when the Sacramento River is in flood. An average of 0.58 lb. of water was extracted from each square foot of the spillway surface processed at a cost of 20 cents.

sealing around the mat edges. In cold weather, particularly at night, best results were obtained by delaying the mat application until the concrete started to "bleed".

Vacuum processing stopped

Processing was continued until the surface of the concrete appeared to be dry. At this point the vacuum had completed its usefulness and longer application did not produce further change or improve the condition of the the concrete. Immediately after the mats were removed small ridges of concrete rising in the joint between the mats, were worked out and the entire surface gone over with a powered rotary float. As a final operation concrete finishers went over the surface with steel trowels.

Shasta Dam is a part of the Central Valley project in California now being completed by the Bureau of Reclamation. Work has been under the general supervision of H. W. Bashore, commissioner, and S. O. Harper, until recently chief engineer. Ralph Lowry is construction engineer in charge of the Kennett Division. Contractors on the work, Pacific Constructors, Inc., directed by F. T. Crowe, general superintendent, have been cooperative and helpful in adapting the vacuum process to their regular construction methods. W. F. Lockhardt, formerly of the Vacuum Concrete Co., and N. U. Davis, field surpervisor for that organization, assisted with preliminary work and supervised initial installations and operations.

Federal Automotive Taxes for 1944

Federal automobile excise taxes collected during 1944 compared with 1943, as reported by the National Highway Users Conference, are as follows: Trucks, 1944—$10,120,188, 1943—$1,798,380; Automobiles and motorcycles, 1944—$1,559,800, 1943—$1,086,456; Parts and accessories, 1944—$38,775,781, 1943—$25,063,617; Tires and tubes, 1944—$54,250,349, 1943—$31,947,997; Lubricating oil, 1944—$66,282,554, 1943—$49,210,861; Gasoline, 1944—$328,597,298, 1943—$265,303,272; Use of motor vehicles, 1944—$128,054,437, 1943—$134,619,279.

Floods Estimated by Probability Method

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***Contents in Brief**—Defining a flood for mathematical purposes as the largest daily discharge observed in a 365-day period and considering flood as an unlimited statistical variable, the author utilizes the theory of probability to estimate future floods. The probability of a flood equal to or less than a certain magnitude is expressed by a formula, but to facilitate the application of the theory a special probability plotting paper is used. However, since there is no plotting position on probability paper for zero or one, in order to plot the entire series of observations, it is suggested that the plotting positions be based on the probabilities of the most probable floods. The procedure is demonstrated for the floods of the Mississippi River as recorded at Vicksburg from 1890 to 1939. The author, a graduate of the Universities of Munich and Berlin, formerly was professor of statistics at the Universities of Heidelberg, Germany, and Lyon, France, and lecturer at the Henri Poincaré Institute, University of Paris.*

WHAT PROVISION TO MAKE for floods is one of the central problems arising in engineering design. An estimate of future floods is a prerequisite for the planning of bridges, dams, channels and reservoirs and is essential for flood control, navigation, irrigation and hydroelectric projects. Consequently, methods for long-range forecasting based on past records of floods occupy an important place in hydrologic theory.

The first systematic study on floods was made about 40 years ago by Weston E. Fuller, who introduced the fundamental idea that floods are unlimited statistical variables. This amounts to saying that however large a flood may have been, there will come a day when this flood will be superseded in size.

A systematic statistical study of floods was also made by Allen Hazen, who conserved Mr. Fuller's interpretation of floods as unlimited variables. Mr. Hazen constructed a probability paper for floods and introduced a specific way of plotting on it.

In the method to be presented, the fundamental idea of Mr. Fuller that floods are unlimited variables and Mr. Hazen's use of probability paper are conserved. However, this method differs from Mr. Hazen's with respect to the analytical expression for the distribution of floods and with respect to the plotting positions of floods in order to produce estimates of greater accuracy.

Flood defined

In the usual concept, a flood exists when the gage height of a stream exceeds a certain level and the flow threatens life or property. However, this limiting gage height depends on many circumstances and cannot be defined in statistical terms. If the theory of probability is to be used, a flood must be expressed in terms that can be used mathematically. Therefore, a flood is defined as the largest mean daily discharge, measured in volume per unit of time, among the 365 observations of a calendar year.

Whereas any year might produce several inundations, or none at all, there is one, and only one, annual flood, which need not be an inundation and might even be a drought.

This definition of a flood has a concrete meaning in terms of probability. If observations cover n years, there are n floods. These can be arranged in order of magnitude, starting with the smallest flood x_1 and listing them consecutively, x_2, x_3.....up to the largest flood x_n. If these floods are grouped according to whether they are equal to or less than any given flood, the number in any group is called the frequency of that flood.

For example, if records kept for a stream for 100 years show that 5 floods smaller and 95 larger than 1,000 cfs. have occurred, the observed frequency of the 1,000 cfs. flood is 5. Note that a theoretical frequency, 5, divided by the number of observations, 100, is the probability of a flood equal to or less than 1,000 cfs. occurring in the future.

The theoretical frequency, if known and plotted graphically, would be a continuous line. Its derivative is called the theoretical distribution.

Since any flood x has been selected as the largest value of a group of 365 observations, the distribution of x depends upon the initial distribution of the flows from which it was taken. However, the nature of the initial distribution is not so important as might first be thought. Its influence decreases if the number of observations in the group is sufficiently large and if the initial distribution converges quickly toward zero for large values of the variable. As explained in "The Return Periods of Flood Flows", by the writer (*Annals Meth. Statistics*, vol. XII, No. 2, 1941), under these two conditions there exists only one distribution of the largest value. The form of this distribution is independent of the initial distribution. This purely mathematical fact permits the application of the distribution of the largest value to very different phenomena and even to cases where the analytical nature of the initial distribution is not known.

Depending upon the data, the distribution of the largest value contains

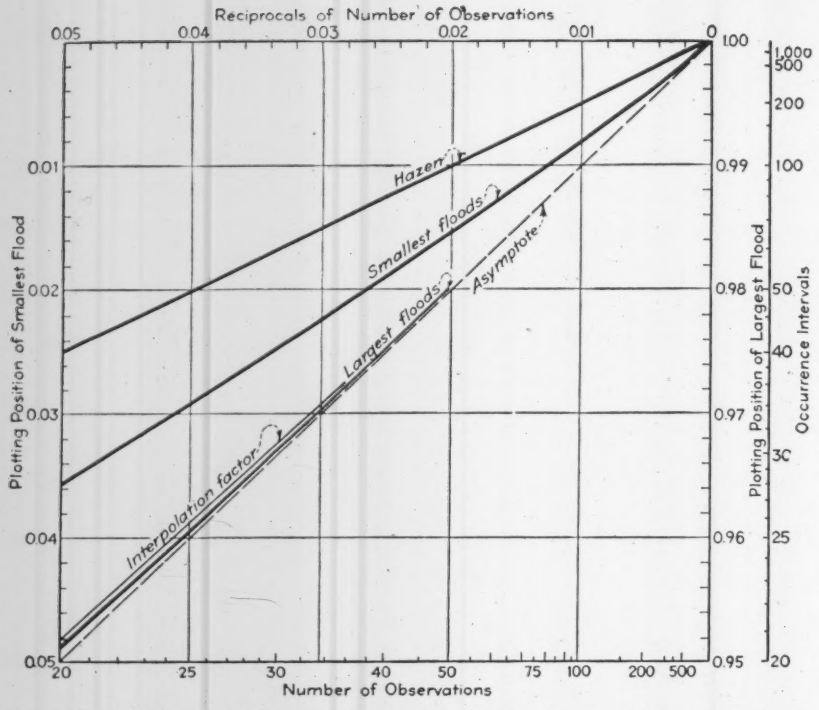


Fig. 1. The plotting positions for the smallest and for the largest floods obtained by the occurrence interval method are compared with Mr. Hazen's plotting positions. Interpolation factors for intermediate floods are also given.

two parameters u and a. The parameter u is identical with the mode, which is the most probable value of x. The mode is, therefore, the most important characteristic of the distribution of x. This parameter, u, the most probable flood, cannot be obtained directly from the observations, which form a discontinuous series, but has to be calculated from a formula which is given below.

The two parameters u and a depend upon the stream studied. They can be calculated from the mean flood $\bar{x}$ and from s, the standard deviation (root-mean-square deviation) of the floods by the formulas:

$$\frac{1}{a} = \frac{s\sqrt{6}}{\pi}\ ;\ u = \bar{x} - \frac{0.57722}{a}.$$

Thus, $1/a$ measures the deviations of the floods from the mean annual flood. Another interpretation of this constant will be given later.

Probability of Floods

In terms of the two parameters, a reduced, dimensionless variable y (reduced flood) is defined as a linear function of x:

$$y = a\,(x - u).$$

As shown in "The Return Period of Flood Flows", the probability $F(x)$ of a flood equal to or less than a certain value x is given by the formula

$$F(x) = e^{-e^{-y}}$$

where $e = 2.718.....$

To facilitate the use of this probability formula, plotting on a special probability paper, Fig. 2, which is analogous to the normal probability paper and to Hazen's probability paper, is recommended. (Copies may be obtained from the author.) First proposed by R. W. Powell, in "A Simple Method of Estimating Flood Frequency," *Civil Engineering*, 1942, p. 105, this special paper is based on the theory of the largest value. The variable x, measured, say, in million cubic feet per second, is plotted vertically on a *linear* scale. Horizontally, the reduced variable y is laid out within the limits $-2<y<7$, also on a *linear* scale. (In the normal probability paper the limits chosen are -3.7 and $+3.7$). On another horizontal axis, the corresponding values of the probabilities F as obtained from the probability formula are plotted, yielding a non-linear probability scale.

Since the scale of the ordinate for the variable x and the scale of the abscissa for the reduced variable y are both linear, the floods plotted on this paper ought to be dispersed about the straight line $x = u + y\,a$ obtained from the definition of y—provided that our probability formula holds. We cannot expect to obtain exactly straight lines, as there are always deviations between a statistical theory and observations. If Mr. Hazen's theory were right, his graphs should be approximately straight lines, whereas they turn out to be curves. Evidently, the fitting and extrapolating of a straight line is simpler than that of any curve. Consequently, a method of estimating floods based on a linear relationship is preferable to one based on a curvilinear one.

In addition to the horizontal scales for the reduced floods and the probabilities, a third horizontal scale is introduced—the return periods T. These are derived in the following manner. The probability of a value equal to or larger than x is $1-F$. Therefore, the *mean* number of years T necessary in order to obtain once a value equal to or larger than x is the reciprocal of $1 - F$. This mean number of years is called the return period; by definition, $T = 1/(1 - F)$.

It follows from the probability formula and the definition of T that, for large floods, the return periods are related to the reduced floods by $y = \log_e T(x)$. Therefore, the scale of the return periods converges, for large floods, toward a logarithmic scale. This leads to the following interpretation of the constant a: For large numbers of observations, $1/a$ is the rate of increase with respect to the logarithms of return periods of the corresponding floods, namely x. Therefore, $1/a$ is called the logarithmic increase. It will be shown later that the flood x corresponding to a return period T is the most probable flood for $n = T$ years observed, provided that n is large.

Plotting positions a problem

An enigma arises in plotting on any kind of probability paper designed for an unlimited variable because the probabilities zero and unity do not exist on the paper. The n floods x_m ($m = 1,2,...n$) are arranged in order of increasing magnitude. (The index m is called rank.) Probabilities are plotted on the horizontal axis and magnitudes on the vertical axis. The question is where to plot the mth ob-

servation. If we attribute the relative frequency $1/n$ to x_1 and the relative frequency m/n to the mth flood, there is no place for the largest observation, as the probability 1 cannot be plotted on a probability paper designed for an unlimited variable.

We can make another attempt at plotting all the observations. Reversing the previous procedure, we assign the frequency $1 - 1/n$ to the largest flood. The mth observation in descending scale is the $n - m + 1$st observation in ascending scale. The latter, then, has the frequency $(m - 1)/n$. In this case, we cannot plot the smallest observation, since there is no place for the probability zero on a probability paper designed for an unlimited variable.

Thus, for one series of observations we obtain two series of plotted points. In the first series, we have to omit the largest observation, and in the second we have to omit the smallest. This state of affairs is completely unsatisfactory. A way must be found to obtain one single series containing the first and the last observation.

Shortcut procedure

Mr. Hazen advocated a shortcut: Since the plotting position of the mth observation in the above procedures is $(m - 1)/n$ or m/n, he chose $(m - \frac{1}{2})/n$. If these plotting positions are interpreted in terms of return periods, the return period of the third largest observation is $2n/5$; the return period of the second largest observation is $2n/3$; and the return period of the largest is $2n$. Using Mr. Hazen's procedure, we act as if, instead of n we possess $2n$ observations and consequently underestimate the dangers involved in the happening of the largest flood. Therefore, Mr. Hazen's solution is not adequate.

Instead of advocating a solution valid for any distribution, we now construct a statistical solution that depends upon the distribution with which we are concerned. Consider a statistical variable having a certain initial distribution. Then, the mth observation, being such that $m - 1$ observations are below it and $n - m$ observations are above it, is also a statistical variable and has a distribution that depends upon the numbers n and m and the initial distribution. Clearly, the concept "distribution of the mth value" is a generalization of the concept "distribution of the largest value" introduced before.

If the initial distribution is unlimited, then each of these n new distributions passes through a maximum, which corresponds to the most probable mth value. It is logical to choose as plotting position for the mth observation the probability of a value equal to or less than the most probable mth value. For example, the plotting position of the sixth largest flood is selected as the probability of a flood of magnitude equal to or less than the magnitude of the most probable sixth largest flood. In other words, we presume that what has happened was the most probable event to have happened.

The application of this procedure to all n observations would be tedious and impractical. However, satisfactory results may be obtained using approximations to the most probable values. To the first observation, x_1, may be assigned the probability, F_1, of the most probable smallest value, and to the largest observation, x_n, the probability, F_n, of the most probable largest value. Between them are contained the $n - 2$ intermediate observations. It is common sense that all plotting positions F_m must be equally

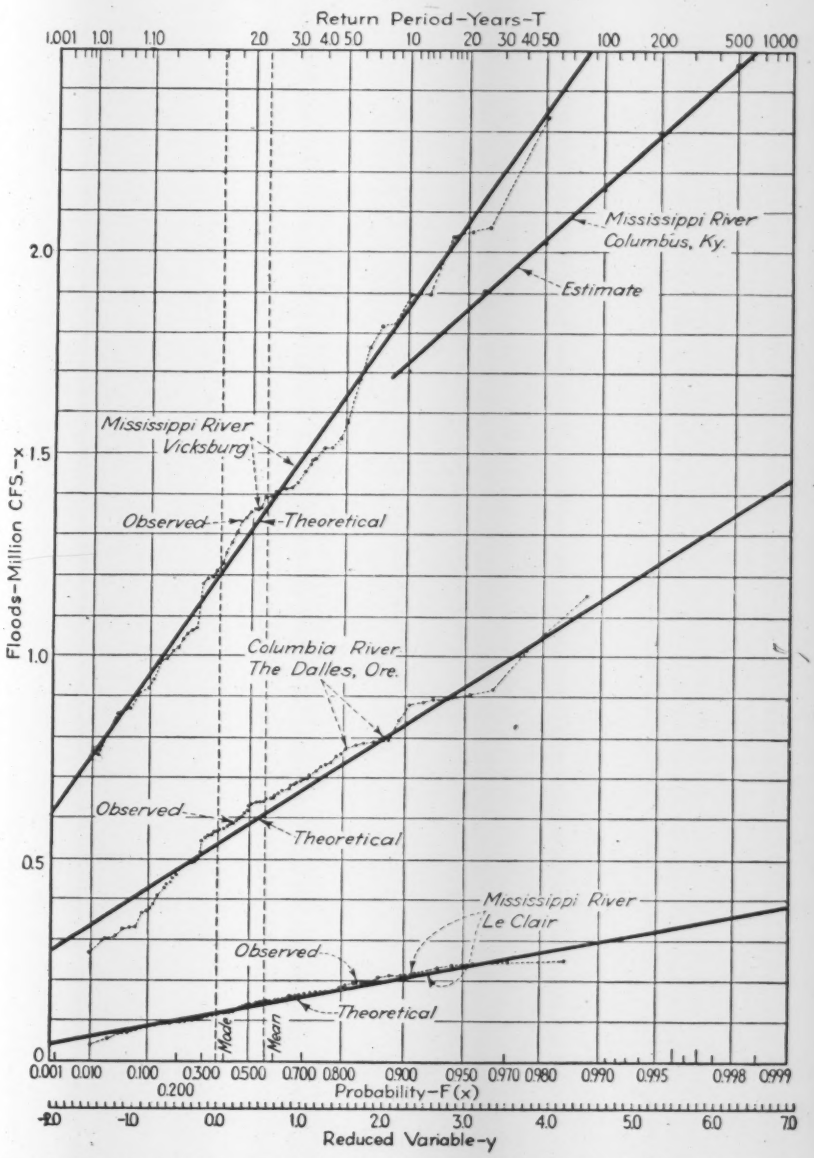


Fig. 2. The straight lines plotted on special probability paper and expressing the theoretical relationship between the magnitude of floods and the probability of their occurring fit observed values closely.

TABLE I—PLOTTING POSITIONS OF FLOODS

Number of observations n	$10^3/n$	Plotting positions $10^3 F_1$	Plotting positions $10^3 F_n$	Interpolation factor $10^3 \frac{F_n - F_1}{n-1}$
15	6,667	4,600	93,551	6,354
20	5,000	3,554	95,123	4,819
25	4,000	2,902	96,079	3,882
30	3,333	2,456	96,720	3,251
35	2,857	2,130	97,182	2,796
40	2,500	1,882	97,531	2,453
45	2,222	1,687	97,802	2,184
50	2,000	1,529	98,020	1,969
55	1,818	1,398	98,198	1,793
60	1,667	1,289	98,346	1,645
70	1,429	1,131	98,581	1,412
80	1,250	982	98,758	1,238
90	1,111	878	98,895	1,101
100	1,000	795	99,005	992
120	833	668	99,170	828
140	714	576	99,288	710
160	625	507	99,377	622
180	556	453	99,445	553
200	500	409	99,501	498
250	400	330	99,601	399
300	333	277	99,667	332
350	286	238	99,715	285
400	250	209	99,750	250
500	200	168	99,800	200
750	133	114	99,867	133
1,000	100	86	99,900	100
10,000	10	9	99,990	10

spaced between F_1 and F_n. Therefore, the plotting positions for the intermediate observations are obtained by linear interpolation between F_1 and F_n:

$$F_m = F_1 + (m-1)(F_n - F_1)/(n-1).$$

The expression $(F_n - F_1)/(n-1)$ is called the interpolation factor. Thus, we obtain one and only one series of observations. It can easily be shown that the plotting positions F_m fulfill, for the usual distributions, the evident condition

$$(m-1)/n < F_m < m/n,$$

which was the basis for Mr. Hazen's construction.

Plotting positions of floods

The general method of determining plotting positions just explained may be applied to the distribution of floods. The largest flood is equivalent to the largest value in a sample of size n taken from a distribution of the largest value. Its plotting position F_n is the probability of the most probable largest flood. A simple calculation leads from the probability formula to

$$F_n = e^{-1/n}.$$

For increasing numbers of observations this plotting position converges quickly toward $1 - 1/n$.

Similarly, the smallest flood is equivalent to the smallest value in a sample of size n taken from a distribution of the largest value. ("On the Plotting of Flood Discharges," by E. J. Gumbel, *Trans. Am. Geophysics Union*, 1943). The probability F_1 of the most probable smallest flood is also obtained from the probability formula.

$$\frac{1}{n} = \frac{F_1(-\log_e F_1)}{-\log_e F_1 - 1 + F_1}$$

Since F_1 is a fraction, the expression $-\log_e F_1$ is positive. For increasing numbers of observations, the plotting position F_1 converges slowly toward $1/n$. The different behavior of F_n and F_1 is due to the well-known asymmetry of the distribution of the floods, a fact which is neglected in Mr. Hazen's procedure.

To facilitate the use of the formulas for the plotting positions of the smallest and largest floods, values of F_1 and F_n are listed in Table I as functions of the number of observations. Both plotting positions are nearly linear functions of the reciprocal of n, as indicated in Fig. 1, in which the plotting positions given in Table I are compared with those obtained by Mr. Hazen's procedure. Mr. Hazen's plotting positions are seen to be too small for the smallest floods and too large for the largest floods.

Return periods, $T_m = 1/(1 - F_m)$, obtained from the plotting positions of Table I are called occurrence intervals. When these intervals are plotted, it will be found that for the smallest observations we plot frequencies near to m/n and that for the largest observations we plot frequencies near to $(m-1)/n$. The occurrence interval of the largest observation is neither infinite, as in the case of the first plotting procedure tried, nor is it $2n$ as for Mr. Hazen's method, nor is it n as in the case of the second procedure. Instead, since F_n is approximately $1 - 1/n$, it is a value approaching n with increasing numbers of observations. The exact manner of this convergence can be stated only for a definite distribution.

Most probable largest flood

The analytical expression, obtained from the formula for F_n, $T_n = 1/(1 - e^{-1/n})$ converges quickly toward n. For $n \geq 10$ the occurrence interval of the largest flood is simply the number of years observed. Now, the most probable reduced largest flood y_n for n years, obtained from the formulas for $F(x)$ and F_n, is $y_n = \log_e n$. Since we may identify the number of observations with the occurrence interval, the flood corresponding to a given occurrence interval T is the most probable flood for $T = n$ observations. Thus, the most probable largest flood $\tilde{x}_n$ as a function of the number of years is, for $n \geq 10$,

$$\tilde{x}_n = u + \frac{1}{a}\log_e n,$$

and $1/a$ measures the increase of the most probable largest flood with the logarithm of time. It can be seen that the most probable largest flood for n years converges toward a linear function of the logarithm of the years observed. A similar conclusion was reached by Mr. Fuller from purely empirical considerations.

Up to now we have discussed mainly the plotting positions of the two extremes but have indicated that the plotting positions of the intermediate observations may be obtained from the formula for F_m. The interpolation factors $(F_n - F_1)/(n-1)$, given in Table I and plotted in Fig. 1, are nearly equal to $1/n$. This result was to be expected, for the difference between the relative frequencies of two successive observations must be of the order of magnitude $1/n$.

It can be shown that the occurrence

intervals T_n, T_{n-1}, T_{n-2}, for the three largest floods are approximately

$$T_n = n + \frac{1}{2}\,;\; T_{n-1} = \frac{n}{2} + \frac{1}{4}\,;$$

$$T_{n-2} = \frac{n}{3} + \frac{1}{6}\,,$$

as compared with the return periods of $2n$, $\frac{3}{2}n$ and $\frac{2}{3}n$, respectively, corresponding to Hazen's plotting positions, as stated previously.

Procedure summarized

The procedure of forecasting floods may be summarized by the following steps:

1. Take the largest daily mean discharge for each year and arrange these annual floods in increasing order.

2. Calculate the mean flood $\bar{x}$, the standard deviation s, the mode u and the logarithmic increase $1/a$.

3. Take the plotting position F_1 of the smallest flood x_1 and the plotting position F_n of the largest flood x_n from Table I and calculate the plotting positions F_m of the intermediate floods x_m.

4. Plot the points x_m, F_m on the special probability paper.

5. Draw the theoretical straight line $x = u + y/a$. Extrapolation gives the most probable largest flood to be expected within any period desired.

Like any statistical method, this procedure is based on the assumption that the previous conditions will prevail in the future and on the recording of a sufficient number of observations. Therefore, it is vain to estimate from a few scattered data.

Mississippi floods plotted

In order to demonstrate the procedure of estimating floods by the occurrence interval method, records of floods of the Mississippi River, as registered at Vicksburg in the $n = 50$ years 1890-1939, will be used. From these observations, the mean annual flood $\bar{x}$ is found to be 1.35560 million cfs. By summing the squares of the deviation of each flood from the mean, dividing by $n - 1$ and taking the square root of the quotient, the standard deviation s is calculated to be 0.34133. From this the logarithmic increase is determined:

$$\frac{1}{a} = \frac{s\sqrt{6}}{\pi} = 0.26613.$$

Then, the mode or most probable annual flood

$$u = \bar{x} - 0.57722/a = 1.20198.$$

From Table I for $n = 50$, the plotting positions, $F_1 = 0.01529$ and $F_n = 0.98020$, and the interpolation factor 0.01969 are obtained. Linear interpolation between F_1 and F_n using this factor leads to the plotting positions of the intermediate floods. Table II contains the plotting positions for some of the smaller and some of the larger floods.

The 50 observations are plotted in Fig. 2. The theoretical straight line $x = 1.202 + 0.266y$ passes very well through the observations. The largest flood observed was 2.3 million cfs. The most probable largest flood within the next 50 years is 2.6 and within the next 100 years 2.7 million cfs.

The characteristic values for the Mississippi at Vicksburg are compiled in Table III. The corresponding data for the Mississippi river at Le Clair, Iowa, and for the Columbia river at The Dalles, Oregon, are also given, and the observed and the theoretical floods plotted in Fig. 2. It can be seen that the observations plot closely around the theoretical straight lines. For the Mississippi at LeClair the most probable flood within the next 100 years is 0.3 million cfs. and for the Columbia river it is 1.2 million cfs. Also, an estimate of the future floods of the Mississippi at Columbus, Ky., made by the Mississippi River Commission (*House Document No. 259, 84th Congress, first session, 1935*) is shown. This estimate, too, lies close to a straight line. Numerous other applications published in previous papers lead to further confirmations of the theory. (For example, see "Probability Interpretation of the Observed Return Period of Floods," by E. J. Gumbel, *Trans. Am. Geophysics Union*, 1941.)

TABLE II—PLOTTING POSITIONS FOR EXTREME FLOODS OF MISSISSIPPI RIVER (Vicksburg)

Flood-million cfs x_m	Rank m	Plotting Positions F_m
0.760	1	0.015
0.866	2	0.035
0.870	3	0.055
0.912	4	0.074
0.923	5	0.094
0.945	6	0.114
1.822	45	0.882
1.893	46	0.901
1.893	47	0.921
2.040	48	0.941
2.056	49	0.961
2.334	50	0.980

TABLE III—CHARACTERISTIC VALUES OF RIVERS

	Mississippi		Columbia
Station	Vicksburg	LeClair	The Dalles
Years Observed—n	50	68	83
$1/n$	0.02000	0.01471	0.01191
F_1	0.01529	0.01145	0.00938
F_n	0.98020	0.98551	0.98817
$(F_n - F_1)/(n-1)$	0.01969	0.01454	0.01194
Mean Flood—$\bar{x}$	1.35560	0.14252	0.61766
St'd. Deviation—s	0.34133	0.04924	0.17371
Modal Flood—u	1.20198	0.12036	0.53948
Log. Increase—$1/a$	0.26613	0.03839	0.13544

Better Airfield Landing Mats By U.S. Engineers

For building airfields in the war theaters, the Office of the Chief of Engineers, as of April 1, 1945, had purchased 1.4 billion sq. ft. of emergency landing mat at a cost of $275,000,000. The material is being used by the Aviation Engineers and other construction units of the Army.

The development of landing mat by the Corps of Engineers, was started at Langley Field, Va., and later transferred to the Engineer Board at Fort Belvoir, Va. Many types of mat were submitted for approval and test. Among those projected were 12 steel grids, five steel planks, four wire types, four wood types, and even one old-tire rubber mat of the "doormat" type, and an impregnated cocoa fibre mat. These and other types were given every possible consideration because the Engineers were searching for the most satisfactory type of mat from every viewpoint.

A grid type, a rod-and-bolt design, and the pierced plank type were in use for a time. However, tests conducted by the Engineers showed the satisfactory performance of the pierced-plank type in the theaters of operation and this was adopted as standard. Many improvements were made, including the raised "button" to prevent sideslip and to furnish added traction in stopping the fast-landing planes.

The pierced-plank type of landing mat also lends itself to easy salvage. As a result of recent developments, many of these mats, after serving their initial purpose, are salvaged and reused, generally at a point farther toward the front lines.

Under development also is an aluminum alloy mat, some of which have already reached the field.

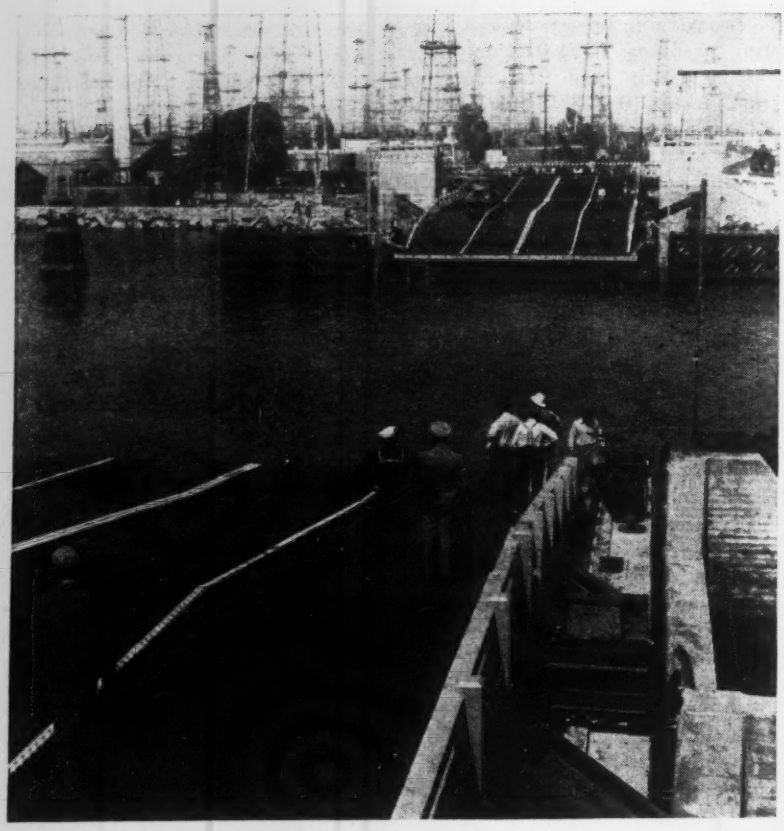


Fig. 1 Four-lane retractable pontoon bridge with 170-ft. clear span in open position. Note recesses for shear lugs in face of far pontoon.

Four-Lane Retracting Pontoon Bridge

***Contents in Brief**—Two concrete pontoons, each 50x132 ft. in plan, are moved by two 40-hp. motors to and from retracted positions under the approach ramps of a roadway crossing a channel 170 ft. wide. Pontoons were cast in excavations on shore kept dry by wellpoints during construction. Original ideas appear in shear lugs, guide yokes and ramp knuckles.*

A WARTIME NEED for some means of taking a four-lane highway across the east entrance to Cerritos Channel in Los Angeles Harbor called for a movable bridge of a type that would not involve extensive use of structural steel, at that time a highly critical material. A satisfactory solution of the problem was found in a design using two retractable, concrete pontoons arranged to slide back under the approach ramp on either side.

This arrangement required very little steel, did not involve heavy foundation work and left the channel entirely unobstructed when the pontoons were retracted. With a 40-hp. motor on each pontoon it is possible to open or close the bridge in 1½ min., thus meeting the speed requirement in a location where water traffic necessitates operating the span as many as 40 times in 8 hr.

Pontoons cast on shore in basins

The two concrete pontoons, 50x132 ft. in plan and weighing about 1,200 tons each, were constructed on shore at a nearby point where excavation below water level could be kept dry by the use of wellpoints. In these "drydocks" the forms were set up and the pontoons were cast and cured. When the time came for launching, wellpoint pumps were stopped, the docks flooded and the pontoons floated. Sand was then dredged away to make an access channel, and the pontoons were towed to the bridge site.

Although there is a motor and winch on each ramp, remote controls are centralized in a single station from which a submarine cable goes across the channel. Thus both motors are operated simultaneously from the bridge tender's control house.

Separation between fixed and sliding portions of the structure is in the plane of the pontoon deck on which the lower portion of the ramp is supported. The ramp has wheels on its bottom that bear on three lines of heavy crane rails, the latter running the full length of the pontoon embedded in the concrete deck. As the pontoon moves forward and back, the ramp remains stationary while the ramp wheels permit the rails to slide beneath them. This lower part of the ramp is in effect a truck transmitting weight to a track beneath.

In addition to transmitting vertical load to the pontoon, the rigid frame of the lower ramp performs another function, that of guiding the pontoon to make sure that when the draw is opened or closed the movement is controlled and kept strictly parallel to the roadway center line. This is accomplished by another set of wheels attached to the ramp with bearing surfaces in vertical planes near the four corners of the ramp framing. These wheels, in a rigid wheel base 26 ft. long, bear against crane rails attached to the inner faces of concrete curbs on both sides of the pontoon. Horizontal thrust is taken up by guide yokes from the ramp framing to trunnion bearings on concrete towers flanking the approach ramp on both sides.

These guide yokes take horizontal load regardless of vertical movement resultant from changing tide levels.

The ramp, in turn, holds the pontoon in alignment for all longitudinal movement, whether in the slight changes that occur when the ramp moves forward or back slightly as the tides rise and fall, or in the more extensive movement when the pontoons are drawn forward and back in operation of the draw span.

In normal operation the horizontal thrust is relatively light. However, if very strong winds or tidal currents were to occur, some supplementary means of taking abnormal horizontal thrust might be needed as a safeguard. This is provided by rubbing rails, mounted on the sides of the pontoons, which take the thrust to pile dolphins after horizontal forces have moved the pontoons transversely about 1 in. The guide yokes will take this much deflection without injury.

This combination of rubbing rails and wheel guides provides (1) a safeguard in emergencies that prevents excessive lateral movement and (2) a means of avoiding the excessive friction that would result if the side rails were the only guides. Under the very moderate lateral thrust that results from normal tidal currents the pontoons move forward and back freely and smoothly, requiring a minimum of power and with no risk of binding or excessive friction.

Interesting ramp design problem

The ramp design presented interesting problems in the desirability of having minimum thickness of floor section and minimum weight consistent with capacity for an H-15 loading. Steel bridge grating was used for the wearing surface. The ramp consists of two parts. The lower part or ramp proper, which has already been mentioned, is wedged shaped in side elevation and rests on the pontoon with which it moves up and down as tide level changes. The pontoon slides under this ramp whose rear edge is thus kept at a constant height above the deck. The other or upper portion of the ramp, inshore from the part on on the pontoon, is about 80 ft. in length, has a hinged joint at fixed level on the inshore end and its outer end rests on the rear of the lower or floating ramp.

This upper ramp has a joint or knuckle near its midpoint where there is a necessary intermediate support. The height of this support had to be made adjustable to compensate for tidal changes, and a knuckle joint was accordingly provided. The adjustment is made at intervals by motor-operated control. In other words, the operating attendant, who has to be constantly on duty to operate the draw span, moves the knuckle and its support up and down as often as tide level changes produce a sharp angle in the grade change at the knuckle. This has been found to be a feasible solution of the problem because attention to height at the knuckle is not required frequently nor is nicety of adjustment important.

The necessity for providing clearance under the inshore end of the ramp for water taxis, plus a predetermined width of the channel, determine the maximum slope of the ramp, which is about 17 percent. Tidal range made it necessary to provide for a maximum vertical movement of 11 ft., but velocities are low, ranging up to only 0.8 knots.

The pontoons are held together at

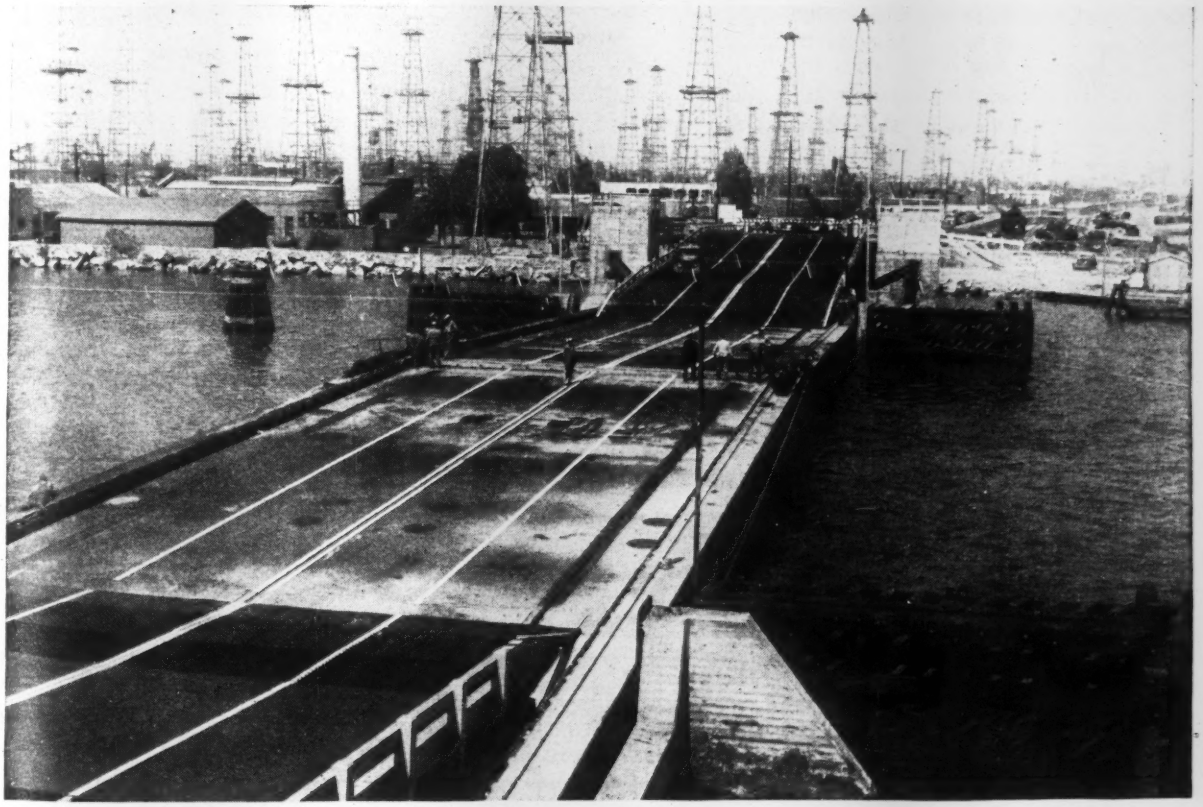


Fig. 2. The pontoon bridge in closed position provides a four lane river crossing. Diagonal steel beams extending from concrete towers on the far side are guide yokes which prevent lateral movement during operation.

the center of the channel by means of latching devices operated by hydraulic drive. The connection is designed to transmit sufficient tension across the joint to cause the pontoons to react, under horizontal forces, as a simple beam from ramp to ramp.

Traffic at certain times of the day is practically all in one direction so that there is a tendency for the pontoons under this tractive force to move from their center position. Since the ramps must be able to adjust themselves to different tide levels and consequently must be free to move on the pontoons, the brakes on the traversing gears, which are used to slow down the final closing of the pontoons, cannot be set to prevent this movement. Therefore, in order to keep the pontoons centered and at the same time allow the ramps to be free, four snubbing chains extend from connections on the two sides of the pontoons near mid-channel to anchorages at the fender lines. These chains being of equal length tend to hold the pontoons exactly centered in the channel, because in any other position there is unbalanced tension in the chains.

The pontoons were designed as cellular structures to give maximum strength but also so that a central section, about 25x67 ft. in plan, could be used as a ballast tank for decreasing freeboard. This might be useful, it is thought, if it should be desirable to make the pontoons heavy to resist wave action or to provide greater overhead clearance in the retracted position. Motor-driven pumps in each pontoon provide for removing bilge or unwatering the central tank section when ballast is no longer desir d.

The structure was built under direction of Vice Adm. B. Moreell, CEC, USN, chief of the Bureau of Yards and Docks, Navy Dept. Rear Adm. H. F. Bruns, CEC, USN, is superintending civil engineer area 6. Capt. C. L. Macrae, CEC, USN, was officer in charge at the outset and was succeeded by Capt. J. J. Gromfine, CEC, USN. Lieut. George C. Price, CEC, USN, was resident officer in charge. The design was developed in the office of Austin W. Earl, consulting engineer, San Francisco, where J. G. Wright and H. O. Sjoberg gave special attention to the structural design and M. G. Lewis to the electrical features. C. E. Andrew, consulting engineer of Tacoma, Wash., was consultant and the Guy F. Atkinson Co. San Francisco, general contractor.

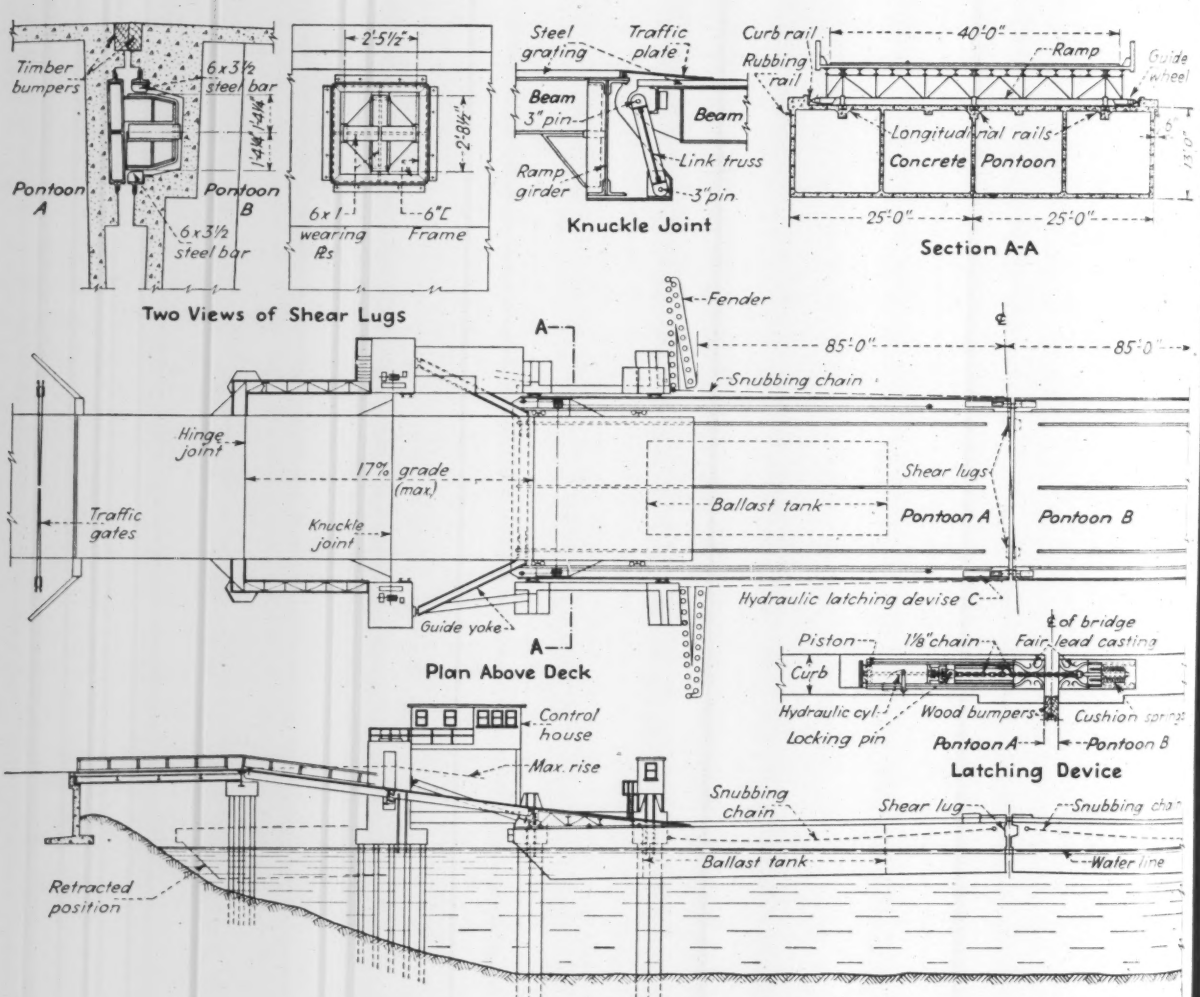


Fig. 3. Plan and elevation of the bridge with enlarged details of shear lugs, knuckle joints and latching devices.

How Much Construction How Soon?

Edward J. Cleary
Managing Editor, Engineering News-Record

● **Estimates of postwar construction volume have been projected using a hypothetical national income, and a frequently cited figure is $16 billion annually. Without presuming to pass judgment on the merit of this assumption, it should be pointed out that equally important to a discussion of how much volume the construction industry should undertake is an estimate of how fast the industry can expand to produce this volume.**

● **When an appraisal is made of the rate of expansion, based on best performance in the past, it becomes apparent that it may require more than three years before construction facilities are geared to a $16 billion annual capacity. The following analysis is based in part on a recent statement made before the subcommittee on public works and construction of the Special Committee on Postwar Economic Policy and Planning of the House of Representatives.**

BIG THINGS HAVE BEEN PROMISED by and for the construction industry in the postwar period. Not the least of these concerns the volume of work that should be ready and can be undertaken if construction is to occupy its traditional role in the national economy.

In this connection the figure most frequently quoted is an annual budget volume of $16 billion. Unfortunately, the connotation is permitted to exist that close to this much work can be done in the first year following the relaxation of restrictions. In fact, some postwar planners have repeatedly urged that a $15 billion backlog of projects be completely designed and ready for contract this summer in order to avert serious consequences. And spokesmen for contractor's organizations believe that the industry has the capacity to attain an annual volume of $12 billion within a single year.

Estimates are too high

The validity of these high estimates of immediate accomplishment is open to question. This is not to imply that the construction industry is incapable of reaching eventually this hitherto unprecedented volume of performance. But it is highly improbable that it can do so in a single year —or, in fact, over a period of three years. To believe otherwise does not appear to be realistic. Some of the reasons for reaching this conclusion are outlined here.

First, however, a word about the projected size of the annual construction budget.

If we examine the relation between net national income and new construction, we find that in the two decades prior to the war it averaged 10.7 percent; the maximum was 14.4 percent (in 1927) and the minimum ratio was 5.7 percent (in 1933). Consequently, if we accept the estimates of economists that the national income in the postwar years will be $150 billion annually, total new construction should then account for a $16 billion volume of business.

It might be pointed out that at no time in the prewar period did new construction reach such a high volume. The greatest recorded volume was achieved in 1942 when it reached $13.8 billion. However, this does not include an undisclosed amount of foreign work, largely military, on which American construction facilities were employed.

As to the outlook for postwar work, latest figures compiled by *Engineering News-Record* reveal that the total volume of identified proposed engineered projects (which does not include small individually built houses) has reached $21.1 million. Possibly some of these projects may never advance beyond the "idea" stage; however, off-setting any such depreciation in anticipated volume is the established fact that private interests have not yet disclosed their future programs.

Engineered construction work on which plans already have been started or completed total $9.0 billion, and this does not include renovation and deferred maintenance, which in the aggregate provides a substantial addition of readily available work.

Mobilization takes time

It is one thing to propose a $16 billion annual construction budget but quite another matter to execute such a program.

The probability of the industry being able to mobilize materials, manpower and machines fast enough to accomplish a $16 billion program of work in the first postwar year—or even in the second and third postwar years—is indeed meager if past performance serves as any guide.

The fact is that at no time in the last two decades has the construction industry been able in one year to expand its annual rate of productivity by more than 62 percent. Most recently, under the extreme urgency of wartime preparations in 1942—when ostensibly nothing except the availability of engineered designs stood in the way of construction expansion—annual volume was jumped from $7.8 billion to $11.7 billion, or 50 percent.

Now, what does this statement of

rate of increase mean in terms of postwar construction? Simply this: With the construction industry operating at the very low output of about $3.3 billion annually (War Production Board estimate), probably the best performance that could be hoped for a year hence—if all restrictions on manpower, materials and equipment were removed today—would be a 62 percent increase, or $5.3 billion.

Optimistically assuming that a 62 percent or equally high rate of increase could be consistently maintained for several years (actually it never has; but the postwar situation may be different because a large volume of project plans are now being prepared in advance), two years later the volume output could be expected to be about $8.6 billion; and at the end of the third year it would provide for a $13.9 billion production.

Thus, not until after three years had elapsed would the industry be geared to operate above the $14 billion range, which is still short of the desired annual goal of $16 billion.

A goal to be sought

It appears, therefore, that immediate concern so far as postwar construction is concerned, should not be related solely to the creation of a huge backlog of planned projects. Rather, we are challenged to determine how fast the resources of the construction industry can be mobilized and expanded so that it will be able to undertake speedily a large volume of essential postwar work.

With the industry geared to its present low rate of performance, it might not be able to execute more than half of the projects already in the design stage. The situation in regard to construction might thus parallel that for consumer goods—too many will want too much too soon.

The *modus operandi* for increasing the annual rate of activity relates, in large measure, to the removal of War Production Board restrictions on construction and building materials production as fast as military commitments will permit. No opportunity should be overlooked in permitting the construction industry to "gear up" its facilities. These facilities—consisting of staff organizations, adequately trained technicians and labor crews, as well as the assemblage of materials and special equipment—require time for their effective mobilization application. How completely these facilities are de-activated at present can be appreciated by the fact that output today is geared to a $3.3 billion tempo as contrasted with $13.8 billion in 1942. Obviously, the higher the initial rate of output the greater will be the potentiality for the industry to expand.

Promise and performance

With full cognizance of the difficulties that confront the WPB in modification of restrictions, coupled with the knowledge that inventories of some of the most essential building materials (notably lumber) are virtually depleted, it appears wholly unrealistic, therefore, to think in terms of a $16 billion annual construction budget for the next three or four years.

These conclusions should not be construed as veiled with pessimism. Actually, the reverse is true. With the promise of accelerating from the present low of $3.3 billion to a $14 billion annual output in three years, the industry faces the prospect of having an expanding market for its services in which it can operate effectively and provide consistent as well as remunerative employment.

The construction industry has done and will continue to do big things. But its spokesmen should not permit postwar promises to exceed performance possibilities.

Use of DDT in Mosquito Control May Prove Boomerang

Dramatic reports of its large-scale use to control epidemics in war areas have fired public imagination and fostered the hasty conclusion that DDT is a complete solution to all of our insect-borne disease problems. However, it must be remembered, says *Public Health Reports* for April 27, that DDT distributed over the countryside not only wipes out malaria-carrying mosquitoes but also may kill other insects, many of which are beneficial. It may be necessary to ignore the effect of DDT on the balance of nature, important to agriculture and wildlife in war areas where the health of our fighting men is at stake, but in the United States such considerations cannot be neglected.

Extensive investigations are now being carried out by authorized agencies to determine the usefulness and possible hazards in the large-scale dissemination of DDT. Until more information has been obtained from such investigations and until it has been evaluated by all interested parties, plans to employ DDT indiscriminately for outdoor area control of insect disease vectors in this country are not to be encouraged.

In setting an example to others in following this principle the Army and the U. S. Public Health Service have agreed, continues the report, on the following joint policy:

1. DDT will be used for residual spray application to houses and other buildings for the purpose of killing adult mosquitoes before they have opportunity to transmit malaria. The long-lasting killing effect of DDT as a residual spray provides a highly effective means to prevent the spread of the malarial parasite. This method of use is safe and economical, and, moreover, is welcomed by the householder because it provides freedom from insect annoyance.

2. The use of DDT as a mosquito larvicide will be limited to experimental investigations and to situations where DDT has definite advantage over other larvicides in saving materials and manpower, and where it presents no hazard to fish and other wildlife.

3. Distribution of DDT from aircraft for large-scale area control of mosquitoes in military and adjacent areas in the United States will be limited to projects conducted with due regard to the possible effects of DDT on beneficial insects and all forms of plant and animal life and in accordance with safeguards established by the Surgeon General of the Army and the U. S. Public Health Service.

Not included in the *Public Health Reports* account is a recent announcement that the U. S. Forest Service is spraying DDT from airplanes in three planned, experimental efforts to control spread of forest insect epidemics. Study of the effect on wildlife will be carried on at the same time.

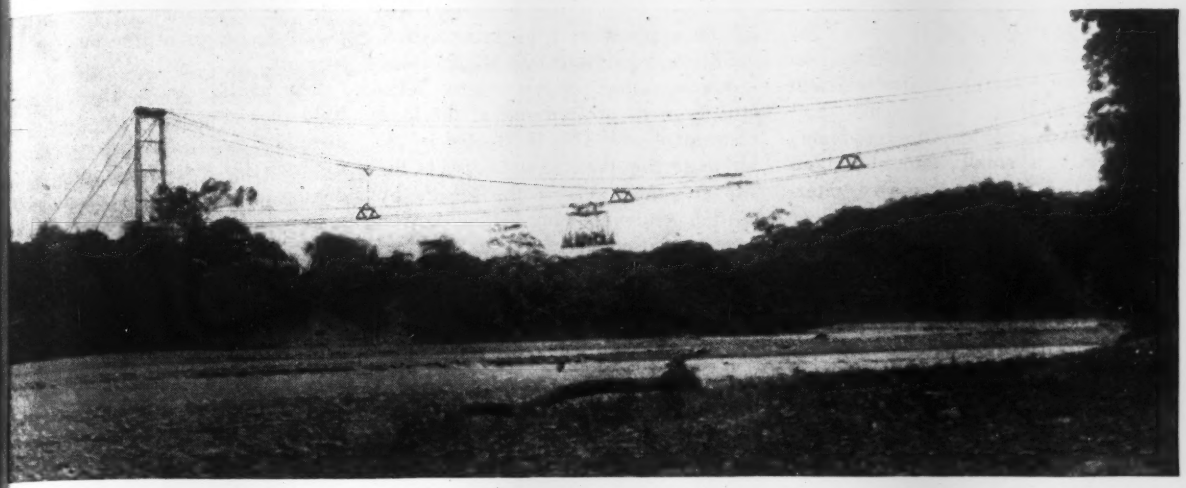


Fig. 1. Compensated cable support for carriage track keeps aerial transporter car on a horizontal path.

Aerial Transporter Bridge in Bolivia

Wm. A. Reeve
Senior Engineer, Bridge Division
John A. Roebling's Sons Co., Trenton, N. J.

***Contents in Brief**—A newly devised arrangement of cables for a transporter bridge makes the path of car travel virtually horizontal, thus eliminating most of the unpleasant effects of cable car travel, as well as reducing the cost of operation. The transporter was fabricated in the United States and carried by mule and canoe far into the Bolivian jungles where it was erected in eight weeks by unskilled local workers.*

A UNIQUE AERIAL transporter bridge, on which a ferry car is carried on a cable tramway, now gives access to an isolated area of Bolivia. By virtue of a newly devised, compensated design for the cable system the path of travel remains practically horizontal, thus almost eliminating the "roller-coaster" effect of the usual cable tramway. This Roebling aerial transporter bridge can safely carry a six-ton loaded truck across an 885-ft. span in 1½ min., yet requires less power for operation than that provided by the ordinary low-priced automobile engine.

The transporter bridge is on a road constructed by the government of Bolivia (*ENR* April 8, 1943, vol. p. 482) for better communication into the provinces of Chapare and Beni where the ranges of the Andes and intractable rivers have kept a large area practically isolated. On this 117-mile road from Cochabamba through virgin jungle over some of the most difficult terrain in the world the Espiritu Santo, one of the tributaries of the upper Amazon, virtually blocked further advance.

The Espiritu Santo has an undulating and shifting bottom with ridges extending to above the surface at several points in the river bed, thus preventing operation of a ferry. Large pack trains carrying rubber and other valuable produce were sometimes held up for days awaiting favorable portage conditions across the river and often men, mules and cargo were washed away and lost. Due to the need for natural rubber this river crossing was vital as the provinces on the far side were rich in that commodity. Funds were not available for a bridge of the magnitude required for such a crossing and search for an economical and safe crossing led to adoption of the Roebling aerial transporter bridge, which was devised and furnished by the John A. Roebling's Sons Company to meet the peculiar requirements of the crossing. The structure has a span of 885 ft. between shore towers, which are 100 ft. and 120 ft. high respectively.

Compensated Intermediate Supports

From Fig. 1 and 2 it will be seen that the structure is essentially a single span aerial tramway. It has an ingenious system of overhead supporting cables that divide the main span into five short sub-spans supported by A-frame track rope saddles. Introduction of the intermediate supports serves to diminish the deep sag that otherwise would be produced by the weight of the track cable and by the passage of the loaded car across the river.

It will be seen in Fig. 2 that the overhead support ropes are brought together at a location above the compensating A-frames. This serves to damp out lateral swaying of the en-

tire suspended system, preventing a build-up of sway in gusty winds. The horizontal plane of the high-tension track cables also provides efficient resistance to lateral movement.

The track cable counterweights move only a small amount—about 4 in. The support rope counterweights have much greater movement and, to avoid the frictional and abrasive effects of sliding over saddles at the tower tops, the support ropes are carried on four-wheel trucks that run on rails over the tower tops. To maintain the stability of the towers and resist any creep to or from the main span, the tower tops are linked together across the 885-ft. span by two tie-cables of galvanized wire strand, with their corresponding inclined backstays anchored to the counterweighted anchorage frames.

A multi-wheeled carriage is supported on the two track cables and from it is hung a cage platform, 20 ft. long with 9-ft. clear width. The transporter car moves partly through the tower at either shore and remains suspended from the track while unloading and loading. A counterweighted entry bridge is swung down and hooked firmly to the car to permit passage off or on the transporter. The platform is designed to carry livestock and for a 6-ton loaded truck.

In addition to the leveling effect of the support at four intermediate equidistant points in the 885-ft. span, a compensating support system helps still more to prevent sag at the load concentration. This is effected by interconnecting the support ropes to the two A-frames nearest the towers by an independent, spring-loaded tension rope operating over sheaves attached to the main support cable.

A tension frame is arranged to slide along the overhead support cables in its function as transmitter of compensation between the A-frames nearest the towers. Thus any concentration of gravity loading at or near one of these frames produces an uplift reaction on the rope system at the corresponding point near the far tower, which takes part of the load and reduces the sag at the carriage.

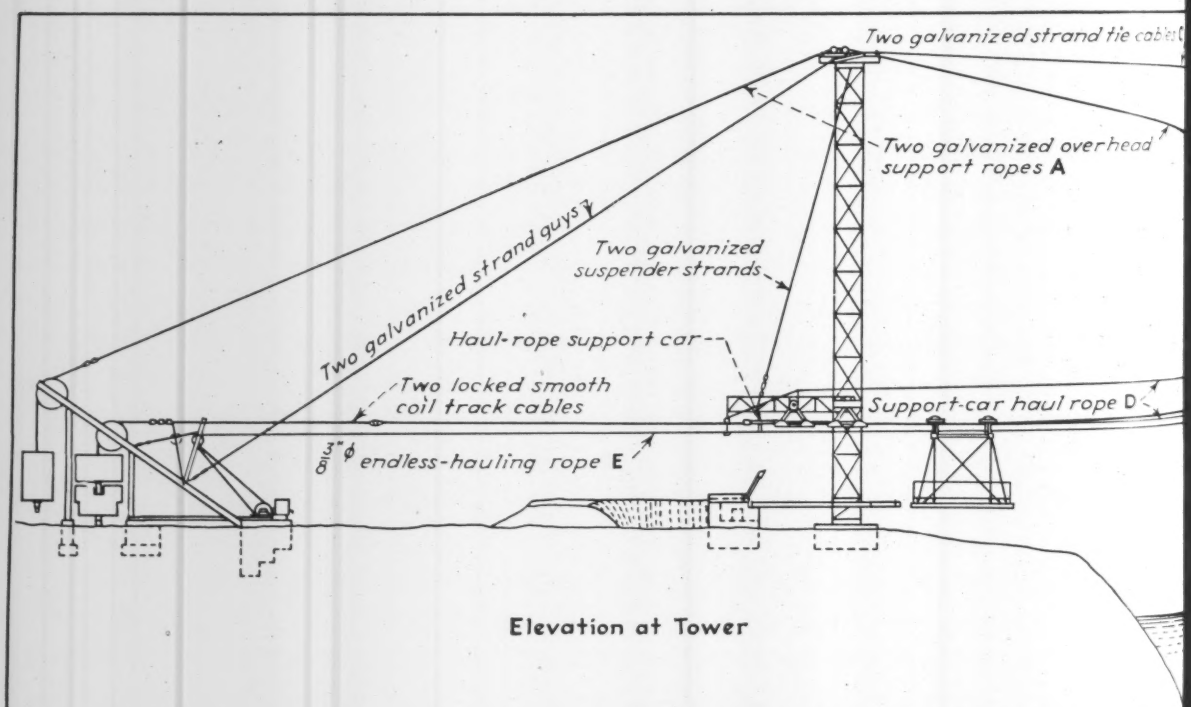
Little tractive power required

An important feature of the transporter is the small amount of hauling power required. Owing to the practically horizontal path of travel, the car does not need to be power-braked while descending into a deep sag nor does it require great power to haul the car up the opposite slope. Thus, power for hauling is limited almost entirely to overcoming the friction of the crossing plus overcoming a very small change of elevation between the points of intermediate support.

The hauling rope, which is a light, flexible steel wire rope, passes around a gypsy-spool driven through a clutch by a four-cylinder gasoline engine of 16 to 20 hp. provided with a speed governor, self starter, battery and generator. This rope is spliced endless and is maintained at approximately constant tension by a spring-loaded sheave at the opposite anchorage of the transporter. The driving unit is mounted on a welded steel bedplate, partly embedded in the concrete, which forms the kicker-block for the inclined counterweight frame seen in Fig. 3. In the event that the engine stalls the transporter car may be brought to shore by hand operation in the car itself.

The hauling rope is always in motion in the same direction and the controls for forward and reverse travelling, start and stop, are in the moving transporter car, yet there are no elaborate and costly contrivances for regulating constant speed.

To prevent deep sagging of the slack or back-tension part of the hauling rope across the 885-ft. span a pair of carriages is provided approximately 442 ft. apart having supporting sheaves to hold up the sag


Two galvanized strand tie cables
Two galvanized overhead support ropes A
Two galvanized strand guys
Two galvanized suspender strands
Haul-rope support car
Two locked smooth coil track cables
Support-car haul rope D
endless-hauling rope E
Elevation at Tower

the rope. These carriages are interconnected by a light-weight secondary hauling rope forming an endless circuit. One of the carriages is always at midspan when the transporter car is in either tower terminal station. One carriage is pushed ahead by the transporter car, the other carriage trails 442 ft. behind.

Erected by unskilled local labor

The transporter was designed and fabricated at the Roebling plant in Trenton, New Jersey, shipped to Arica, Chile, whence it went up by railway to La Paz, Bolivia, 12,000 ft. above sea level. Incidentally, the ship anchored at sea off Arica and several items of shipment fell into deep water from which they were recovered some weeks later by divers. From La Paz the shipments went via Cochabamba to the crossing site in the Matto Grosso jungle—moving by rail, truck, mule and canoe.

Erection was done by unskilled Indians and Bolivian soldiers under the direction of the writer. It was interesting to note the intelligence of these humble but cooperative people in their successful efforts to learn how to assemble and erect structural steel, cables and machinery, splice wire rope endless, as well as to stick spud wrenches instead of their fingers into connection holes. Not one of the workers had ever before seen any of these mechanical things, yet the transporter bridge was installed and running in little more than eight weeks.

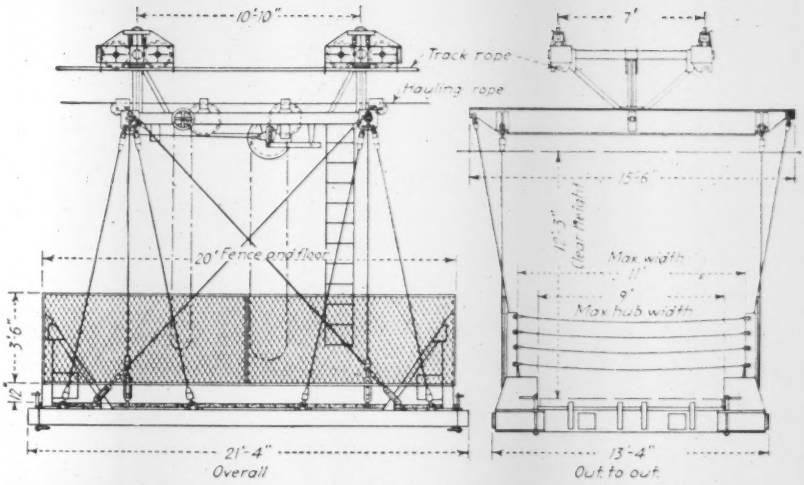


Fig. 3. Transporter car is moved by friction sheaves clamping on a hauling rope that always moves in one direction.

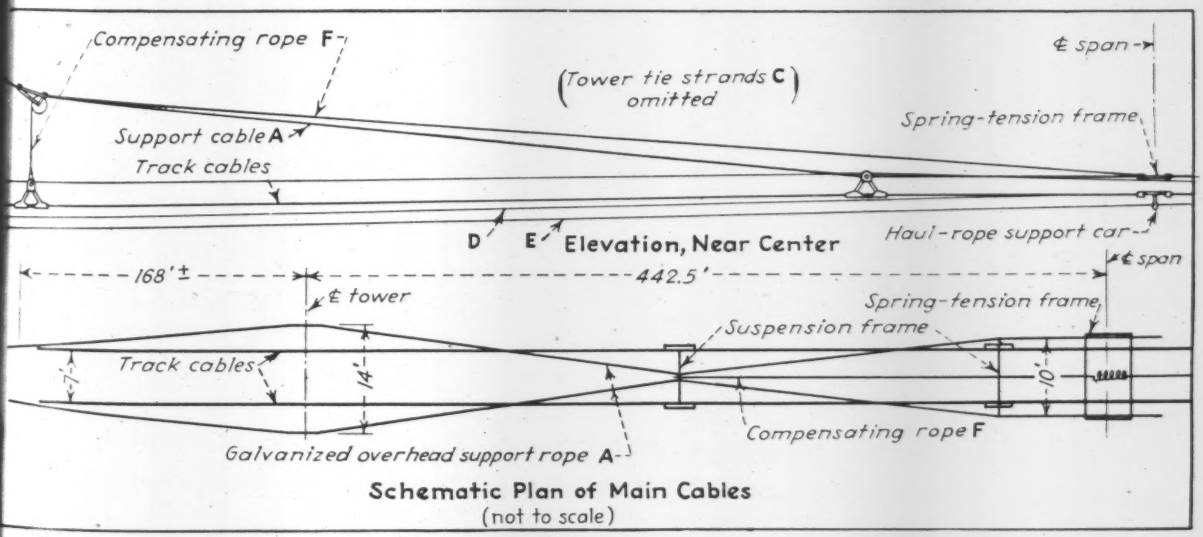
In devising this transporter bridge several very important objectives are achieved. One is the assurance of a virtually horizontal path of travel of the car across the span, which eliminates the somewhat unpleasant effect of the rapid glide down into the deep sag of the track cables and the rapid rise from this sag to the landing place at the far side. This means that elaborate swing damping devices are unnecessary and derailing risks disappear as a consequence. Furthermore, the possibility of cars and trucks breaking loose, due to excessive tilting of the transporter-car floor, is no longer a factor. And finally, the transportation of livestock is facilitated because there is no unusual motion that will inspire fear.

Motive power

The power needed for moving the transporter car is only 20 hp. compared to about 60 hp. required for operation of conventional cableway cars. Use of a small and common power unit with simple controls has special advantages in the isolated area.

This installation is much less expensive, both in purchase price and erection cost, than any other type of bridge, including transporter bridges built with a semi-rigid track, yet it achieves almost the same effect of smooth travel and low cost of operation.

Fig. 2. Cables connect track supports nearest the towers to compensate for load concentrations and reduce cable sag. Horizontal sway is almost entirely eliminated by two track cables and by converging support cables.



From Field and Office

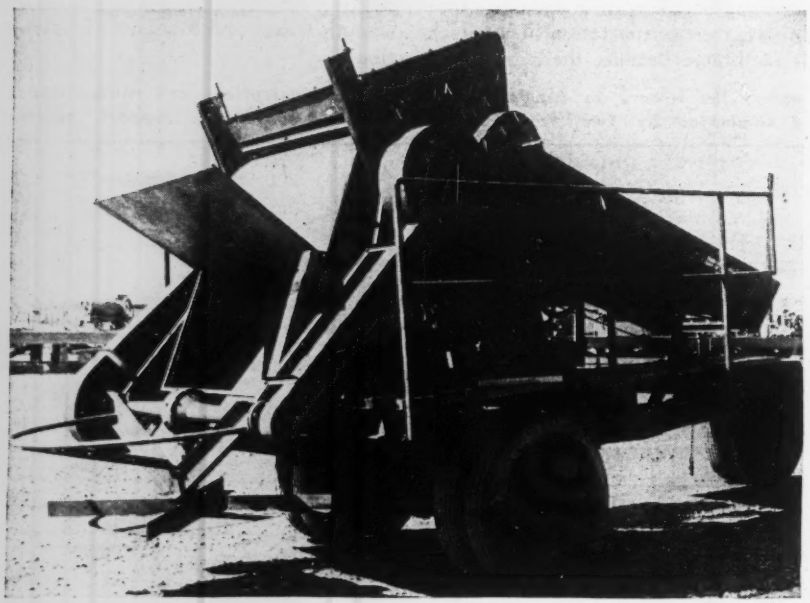
WORKING PROBLEMS AND TIME-SAVING METHODS FOR ENGINEERS AND CONTRACTORS

Machine Developed to Spread Straw on Airfields

A dust palliation problem on new airfields, where wind raises clouds of gritty dust endangering airplane engines, prompted the Sacramento, Calif., division of U. S. Army Engineers to devise recently a special-purpose straw spreader. The machine, weighing about five tons and powered by a salvaged Ford engine, spreads straw and discs it into the ground surface, thereby creating an obstacle to rolling dust particles and reducing wind velocity along the ground.

The device is mounted on a heavy trailer and towed behind a truck loaded with bales of straw. The bales are picked up on a conveyor and hoisted to the hopper at the top of the machine. Here, teeth of a whirling drum shread the straw from the bales and drop it into a second hopper, from where the loose straw falls onto the spinning spreader disc that distributes the material in a swath 25 ft. wide. Operation of the spreader unit, which can distribute straw over one acre in 12 min., is handled by three men.

A tractor-drawn disc harrow follows the spreader and forces the straw into the ground.

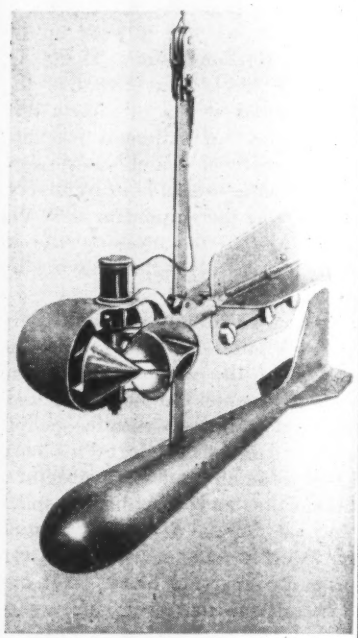


In distributing straw on newly constructed airfields U. S. Army Engineer forces are finding the above spreader very satisfactory.

Low-Velocity Current Meter Shield Attachment

Working toward development of a current meter that will accurately measure low velocities, engineers of the U. S. Geological Survey have devised a shield attachment for the Price-type current meter whereby they can measure velocities approximately 30 percent lower than velocities usually measured. This is accomplished by means of an attachment fitted over the meter cups so as to shield one-quarter of the bucket wheel on the upstream side, thereby eliminating the differential action of that part of the current which opposes rotation of the bucket wheel. Both the standard type meter and the pygmy meter can be shielded in this manner.

In tests of a current meter at the National Bureau of Standards, the lowest velocity at which the meter rated consistently without the shield was about 0.08 ft. per sec., and the "stalling point" was at about 0.05 ft. per sec. Equipped with the shield, the meter rated consistently down to 0.056 ft. per sec., and the "stalling point" was established at 0.033 ft. per sec.



Shield attachment to current meter reduces low-velocity limit of measurements by 30 percent.

Work to date indicates that care must be taken that the shielded meter is maintained in proper alignment with the direction of the current, as angularity in direction tends to decrease the speed of rotation of the bucket wheel. For that reason, twisted strand or cable should not be used for the suspension. A 0.045-inch stainless-steel wire and a 15-lb. C-type weight are recommended for use in low velocities. The shield has been developed and used with both the pygmy and the type-AA current meters by engineers of the Chattanooga, Tenn., district, U. S. Geological Survey, in cooperation with the hydraulic data division of the Tennessee Valley Authority.

Book Notes and Reviews

The month's addition to the engineer's reading and reference list

A Chapter of Cement History

THE MAGIC POWDER—History of the Universal Atlas Cement Co. and the Cement Industry—By Earl J. Hadley. 382 pp. G. P. Putnam's Sons, New York. $3.50.

There are so few literary records of industrial development in the United States that Hadley's "The Magic Powder", which is a history of the Universal Atlas Cement Co., represents a noteworthy addition, in spite of its restricted scope. It centers around the founding and evolution of the Atlas Portland Cement Co. and its younger competitor the Universal, but the author has clothed this framework with a picturesque assemblage of personalities and events of the industry. The result is a document of unusually wide appeal.

The stress laid on the human phases of the history was perhaps dictated by journalistic instinct, but it was inevitable in any case, for the story of the enterprises concerned is mainly a story of men. The record would have little meaning without the names of Navarro and Maxwell, Hagar and Affleck and Smith, and their supporting casts; nor could it picture significant features of the action without referring to such men as Edward Hines, George Bartlett and Clifford Older.

Almost of necessity, some phases of the half-century's history are treated more fully than others. Sales —including markets, promotion and price matters—receive more emphasis than other phases. The boisterous selling years of cement and the rise of the concrete highway pavement are well pictured. At the same time little is said of building-code questions and of the vigorous competition that cement had to meet from steel on the one hand and asphalt on the other. Again, not enough is said of price systems to enable readers remote from the industry to understand the essential points of the controversies over mill prices, basing-point prices, freight rates and delivered prices that figured in the series of government prosecutions and administrative actions to which the cement industry has been subjected.

Without detracting from the merits of the book it may be said that it is not a history of the cement industry as promised by the subtitle, for it makes only casual reference to other companies and does not picture the progress of the industry.

It need hardly be added that the book will disappoint those who look for a history of the technical development of cement and its utilization. While the reader might guess that the magic powder was progressively improved in quality, he would not learn how it was improved or how quality is controlled. He would remain ignorant of the doings of Committee C1, as well as of the remarkably extensive research on concrete, without which the production, sale and use of portland cement could hardly have reached the recorded figures.

But, as said at the outset, Hadley's book is written about the Universal-Atlas Cement Co., not about portland cement, or mills or mixing plants. The real "magic powder" of his story is not the gray stuff sold by the barrel and priced at destination but the gray matter that activated some men in Northampton, New York and Chicago a half-century ago.—*Reviewed by* F. E. SCHMITT, *Denver, Colo.*

Mosquito Abatement

THE MOSQUITOES OF NEW JERSEY AND THEIR CONTROL—By Thomas J. Headlee, 326 pp. Rutgers University Press, New Brunswick, N. J. $4.

Cloaked under a title that belies its wide geographical and scientific usefulness, "The Mosquitoes of New Jersey and Their Control" brings within the covers of a single volume the knowledge of a world authority on mosquito abatement. For more than three decades Thomas J. Headlee, now a professor emeritus at Rutgers University, has devoted his unusual abilities as a scientific sleuth and crusader to the elimination of the mosquito hazard. His success in New Jersey has formed the basic pattern for the establishment of operations throughout the United States as well as abroad.

Divided into two parts, the first section of Dr. Headlee's book is concerned with the classification, description and biology of mosquitoes; here is also included a minute description of the 37 species commonly found in New Jersey. The second part, dealing with control measures, describes ditching procedures for salt-marsh and upland meadow terrain, types and uses of larvicides and the legal and economic phases of control operations. Of special interest is a detailed description of the techniques and equipment used to provide temporary protection from mosquitoes at large outdoor evening gatherings.

The scientific and practical information compiled in this book commends it to sanitary engineers, public health and municipal administrators.

Modern Treatise on Dams

ENGINEERING FOR DAMS, Vol. I, II, & III—By William P. Creager, Joel D. Justin and Julian Hinds. 929 pp. Published by John Wiley & Sons, New York, and Chapman & Hall, London. $15 the set: Vol. I, $4.50; Vol. II, $6; Vol. III, $6.

For several years there has been a real need by practicing engineers for a comprehensive treatment covering investigations of dam sites and the design and construction of various types of dams with their necessary appurtenant works. Each of the authors of this new set of books is a prominent and successful practicing engineer of long standing. With contributions from a few other well-known engineers on special phases of the overall subject, the authors have gone far in satisfying the existing requirement.

The generous bibliography, supplied at the ends of almost all of the twenty-four chapters, will readily enable the engineer or student to delve much deeper into any feature with which he may be concerned on occasion.

Throughout the three volumes the necessary mathematical operations have been explained in a clear and concise manner, and in many cases these have been exemplified for the benefit of the inexperienced. The text is replete with tabulations and graphs of special value to the engineer, and is embellished by numerous

illustrations of completed structures. There are also reproduced many design drawings, thus eliminating the need for greater detail in the text.

Although certain problems in engineering for dar can be solved by mathematical treatment, there are others that are dependent on the engineer's judgment, based on his experience and familiarity with local conditions. Frequent reference to these by the authors provides a balance in the text without which the inexperienced might be encouraged to build dams without expert advise.

The entire work is divided into three volumes of convenient size: the first on general design; the second on concrete dams; and the third on earth, rock-fill, steel, and timber dams. For the engineer engaged entirely on investigations, a thorough understanding of the contents of Volume I should be sufficient. For one charged with the design or construction of an earth, a rock-fill, steel or timber dam, Volumes I and III would probably suffice. But one having the responsibility of building any of the concrete types will do well to have ready access to all three volumes; this, because of the valuable chapters in Volume III on details and accessories and on headwater control.

In Volume I the investigation of dam sites is discussed thoroughly beginning with the reconnaissance, carrying through with the preliminary phase, and finally giving the necessary details of the final stage of obtaining necessary data for design and construction. The second chapter deals briefly but to the point with the all-important matter of the choice of type of dam. That, in turn, is followed by a full treatment on the preparation and protection of the foundation which, if neglected, might readily result in failure of an otherwise safe structure. The authors then include a brief chapter on hydraulic model tests, by one of the contributors, giving examples of hydraulic similitude and appending a large and useful bibliography on the subject.

That discussion is followed by over a hundred pages devoted to the vital subject of flood flows, which contain a useful tabulation of unusual flood peaks throughout the world. The volume closes with a chapter on the several types of spillways used when it becomes necessary to build them separately from the dam.

From the standpoint of the concrete designer and construction engineer, Volume II on concrete dams is the most valuable. The comprehensiveness of the treatment of that subject may be visualized roughly by noting that an itemization of the nomenclature used fills five pages of the text.

The nature of the many forces which will act upon the completed dam is clearly explained. That initial chapter is followed by one on the requirements for stability of gravity dams, which includes discussions of certain necessary factors of safety and a table showing a comparison of stresses and assumptions for existing concrete gravity dams. The remaining chapters are devoted largely to the design, by mathematical analysis, of non-overflow and overflow gravity dams and of arch and buttressed concrete dams. Of particular interest is a chapter on internal stresses and stress concentrations in gravity dams. The volume ends with a pertinent discussion on concrete for concrete dams by one of the contributing engineers.

The greater portion of Volume III is devoted to the subject of design and construction of earth dams, which, on account of the modern researches in the field of soil mechanics, has tended to become more of a science than an art. Soil tests and their utilization are described in considerable detail, which paves the way for a portrayal of the general principles of the design of earth dams.

The stability of earth dams is discussed comprehensively, with close attention being given to the factors of safety.

The chapter on details goes into the important methods of construction and the equipment used in compacting. That is followed by a treatise on rock-fill dams in which the stability is discussed, different types described, and examples cited and illustrated.

The chapters covering steel and timber dams, although somewhat brief, include the important points in the design and construction of such infrequent types and, together with the description of accessories for all dams and a discussion on control of headwater, serve to make the three-volume work complete.

Publication of "Engineering for Dams" comes at a time when, on account of the war, there has been a lull in dam construction but opportunely before the resumption of dam building during the postwar period, probably on a larger scale than heretofore.—*Reviewed by* KENNETH B. KEENER, *designing engineer on dams, U. S. Bureau of Reclamation, Denver, Colo.*

Miscellaneous Notes on Booklets and Reprints

ANNIVERSARY BOOKS have been issued during recent months by three construction firms. These include a large and copiously illustrated volume by James Stewart & Company, New York and Chicago, entitled "A Century in Construction"; a smaller book called "A Century of Heavy Construction Through Three Generations" put out by C. W. Blakeslee & Sons, New Haven, Conn.; and a third entitled "Three Quarters of a Century", issued by the George W. Rogers Construction Corp., New York. The latter two also are illustrated with photographs and sketches of work done by the two companies.

DISPOSAL of surplus construction equipment by federal agencies is the subject of two pamphlets just published. Recommendations as to how disposal should be handled are contained in a pamphlet published by the Power Crane and Shovel Association, 74 Trinity Place, New York 6. Discussions of the subject in the pages of *Engineering News-Record* have been reprinted in a pamphlet entitled, "Things You Ought to Know About Surplus Construction Equipment Disposal", that is available from the editorial office, 330 W. 42nd St., New York 18.

New Engineering Books

FIRE PROTECTION THROUGH MODERN BUILDING CODES—By B. L. Wood. A limited number of copies available from American Iron and Steel Institute, 350 Fifth Ave., New York 1, N. Y.

ENGINEERING PREVIEW—By L. E. Grinter, Harry N. Holmes, H. C. Spencer, Rufus Oldenburger, Charles Harris, R. C. Kloeffler and V. M. Faires. 581 pp. The Macmillan Co., New York. $4.50.

(*Continued on p.* 126)

RUSSIA AND AMERICA

ALLIES—or else . . .

VICTORY in Europe was won only through the combined endeavor of the United Nations. Only through sustained joint effort can the fruits of that victory be reaped.

Without disparaging the truly heroic contributions of others, three of the Allies may fairly be credited with having made the major contributions to victory over the European Axis—the United Kingdom, Russia, and the United States. The close accord of these three nations is no less crucial to the accomplishment of the tasks that remain.

First of these is the war against Japan. It still requires winning. Even without any help from others, the United States could make good this victory, but the war's duration will be speeded by the marshaled effort of the United Nations.

Next, and not less important, is the task of establishing a basis for enduring peace. In this struggle our enemies are more formidable than any we have faced—national ambitions, prejudices, suspicions and distrusts, the staggering burden of tradition and debilitating cynicism born of past failure, the cleaving wedges of divergent languages, thought patterns, economic creeds and procedures—an array of difficulties as baffling as fog and as formidable as a deluge. They can be vanquished only by a continuance of the working accord between the United States, Russia, and Britain that was forged on the anvil of European conflict.

☆ ☆ ☆

This high appraisal of the decisive importance of the Big Three in determining the destiny of the United Nations organization, in no way depreciates the importance of the role to be played by France, by China, or the other freedom-seeking nations represented at San Francisco. All of us are committed to the building of a genuinely representative security organization in the conviction that by such means alone can we possibly achieve a just and lasting peace. But the strength of any international machinery will depend upon the validity of Russian-British-American cooperation. If these three are able to achieve substantial harmony of aim and procedure, a world organization that includes them can operate with effective coherence. If they pull apart, the United Nations will break up into competing and jealously hostile blocs.

This is inevitable because of the sheer weight of these three nations in the world's affairs. Between them they account for perhaps half of the world's income and from two-thirds to three-quarters of its industrial output. Once Japan has been crushed, they will control an overwhelming preponderance of the world's armed might. Each of them will wield military power on a scale quite beyond the power of any embryo security league to hold in check. Only if all three are resolved to keep the peace and to enforce it through the Security Council, can that body hope to accomplish its aim.

Although there is a tendency on both sides of the Atlantic to indulge somewhat recklessly in mutual criticism, the ties between Britain and America are too firm to be severed by any foreseeable strain. But that has not been true of our relations with Russia. Even while fighting a war in which our respective ways-of-life were at stake, the inestimable services of each to the other were rendered as friendly but independent associates rather than as fully trusted partners. Now again, as we approach the difficult and vitally important task of building a world organization and of devising a European peace, the task of our delegates is complicated by national attitudes under which each hopes for the best from the other, while fearing the worst.

But the stakes for us both—and for the rest of the world—are too high to be played for in a diplomatic poker game. Russia has no inhibitions in demanding what she wants, and our own vital interests must be stated and upheld with undeviating firmness. Yet we both must face the stark fact that few advantages that either nation might gain at the cost of dissipating the good will of our wartime association could be worth the price thus paid.

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The first steps toward establishing confidence lie in a frank recognition of what may contribute to the lack of it and in a definition of what can be done to restore it.

1. *Probably the greatest single area of reciprocal distrust between Russia and our own country is based on the fear of each that the other may try to interfere with its domestic, economic, and political affairs.* Each purports to see the beam of meddlesome intervention in the other's eye, while it ignores the mote in its own. Thus the Soviet Union remembers that we participated in the foreign military intervention at the time of her civil revolution, and afterwards lent our support to successive boycotts of her trade, of her gold, and of her credit needs. For our part, we remember the Soviet Union's doctrine, and

aggressive support, of revolutionary international communism.

We feel that Russia should find satisfactory evidence of our present willingness to have her develop her internal institutions as she will in the aid that we have given her during the war, and in the record of our good-neighbor policy as applied to Latin America. She, no doubt, resents our lingering suspicions in the face of her declared policy of 1941 to refrain from any attempt to influence the political or economic structure of foreign nations. Certainly, each of us will need the repeated reassurance that can come only through sustained performance by the other in the years ahead. Meanwhile, much will be gained if each will give to the other's good faith the benefit of the doubt, while it scrupulously guards its own conduct to avoid even the appearance of backsliding.

2. *A second zone of suspicion is created by those measures which each of us interprets as natural and necessary bulwarks of national security when they are our own, but as evidence of dangerously aggressive imperialism when taken by the other.* In our view, at least, such demands as we have voiced for island trusteeships or for other naval bases appear mildly conservative as compared with Soviet claims for annexation of territory and for a general orbit of influence, under governments friendly to her, throughout eastern Europe in particular.

There can be no easy solution to that problem. Bi-focal vision, by which one nation can look through a second lens ground to the prescription of another, seldom is achieved in international affairs. The success of the San Francisco Conference will provide a mechanism for international definition of principles and procedures which at least might relieve the inevitable strains. Most important will be the record of how each of us proceeds in our respective courses of action. Soviet performance thus far is highly unsatisfactory to us. While we have taken pains to clear our procedure with her, she has taken action in the Baltic, in Austria, and in Poland without even advance notice to us.

A major test of our ability to cooperate may be found in the Allied administration of conquered Germany. The proposed four-headed control of a four-way partitioned nation promises to be at best an extremely awkward mechanism of administration. At worst, it can result in continuous and dangerous bickering between the representatives of Britain, France, the United States, and Russia in the Berlin coordinating center, and in hopelessly divergent procedures in their several zones of administration. There will be a compelling need for all of us to exercise all of the wisdom and cooperative resolve that we possibly can muster.

3. *A third testing ground for the future of American-Soviet relationships will be defined by the course of Russia in our continuing war with Japan. We are not unmindful of the toll paid by the Soviet Union in its magnificent European war effort. But we still are locked in a desperate struggle with an enemy that exemplifies the Fascism which America and Russia equally denounce. And that war is being fought in an area where Russian interests are importantly at stake.*

Russia has an extraordinary opportunity to create good will by throwing her weight speedily and effectively on our side. There is no doubt but that the final Pacific settlement will generate problems comparable with those of the European peace, but it is equally certain that the continuation of the European comradeship in arms can do much to promote an enduring and confident postwar friendship.

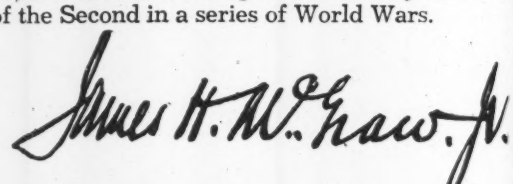
4. *A fourth, and highly important, potential source of suspicion and irritation is the intellectual blockade that the Soviet Union has maintained against the free flow of travel, intercourse, and exchange of ideas.* We can understand the genesis of this policy and the reasons for its continuance while Russia entertained a constant fear of attack by powerful enemies. But the sustained perpetuation of such a quarantine by so strong a nation as the present U.S.S.R. could not be accepted as a protective measure. Inevitably it would generate suspicion that it was rather an instrument of nationalistic isolation or even of contemplated aggression. A way-of-living, at arm's length, with a nation that maintains such intellectual quarantines is possible; any whole-hearted partnership of effort is quite impracticable.

5. *Trading between a free-enterprise nation and one that operates all foreign commerce as a government monopoly can give rise to many frictions.* That subject is too complicated for exposition here. Suffice it to say that, while difficult, it is not impossible to conduct such trade with mutual advantage. We are in a position to help Russia greatly with her program of industrial rehabilitation and expansion at great saving of cost in terms of her current scale of living. In return, we must have assurance that her government monopoly trading will be conducted for commercial rather than political ends, and that it will be used to encourage rather than to restrict multilateral and non-discriminatory world trade.

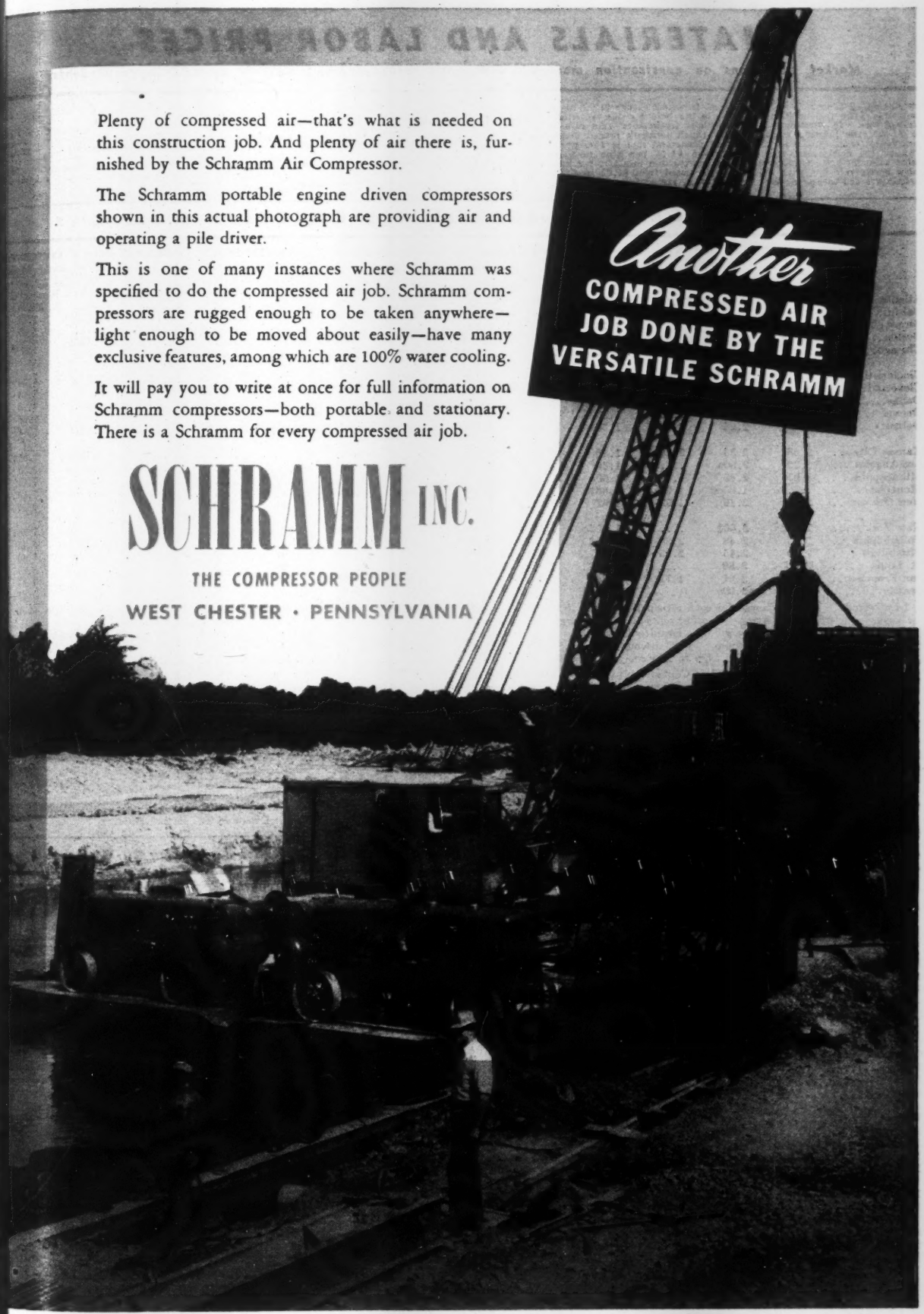
☆ ☆ ☆

This is a representative list of the major areas in which misunderstanding and distrust may be generated, or allayed, in Russian-American relationships. No doubt, an equally honest list drawn by a citizen of the Soviet Union would be more heavily weighted by those features of our behavior which irritate and stimulate distrust on their side. If such a catalog were to be presented, it should receive our most searching and responsible consideration.

For it is of utmost importance that our two nations, in concert with the other United Nations, learn how to get along in mutual confidence and respect. Our understanding of each other now is so imperfect that our negotiations are punctuated with continuous irritations over *little issues.* This, inevitably, will continue until such matters are submerged in the general confidence that can be achieved only through satisfactory settlement of the *big issues.* We must succeed in this, or the defeat of Japan will merely mark the end of the Second in a series of World Wars.



President, McGraw-Hill Publishing Co., Inc.



Plenty of compressed air—that's what is needed on this construction job. And plenty of air there is, furnished by the Schramm Air Compressor.

The Schramm portable engine driven compressors shown in this actual photograph are providing air and operating a pile driver.

This is one of many instances where Schramm was specified to do the compressed air job. Schramm compressors are rugged enough to be taken anywhere—light enough to be moved about easily—have many exclusive features, among which are 100% water cooling.

It will pay you to write at once for full information on Schramm compressors—both portable and stationary. There is a Schramm for every compressed air job.

SCHRAMM INC.

THE COMPRESSOR PEOPLE

WEST CHESTER • PENNSYLVANIA

MATERIALS AND LABOR PRICES

Market quotations on construction materials and wage rates reported monthly by ENR correspondents

INCREASES IN labor rates provide the most important change in the construction material and labor price list in June according to the twenty cities reporting to *Engineering News-Record*. In Birmingham the structural ironworkers' rate rose 12½c. per hour to $1.625, the hoisting engineers' rate which formerly ranged from $1.25 to $1.50 now ranges from $1.375 to $1.625, and plasterers' rate is 15c. per hour higher. In Chicago the bricklayers' rate climbed from $1.75 per hour to $1.90, and common labor rates for both building and heavy construction rose 10c. per hour. The common labor hourly rate for heavy construction increased from $1.00 to $1.10 in New York. Bricklayers and carpenters rose 15c. and 25c., respectively, in St. Louis. Kansas City plasterers' rate, now $1.70, will be $1.75 per hour when the newly established rate becomes effective July 1st.

Ready-mixed concrete is higher in Atlanta and St. Louis, and base mill prices on wire nails, light and re-rolled rails, standard spikes and tie plates have been increased in accordance with the recent OPA authorization. Douglas fir prices are up in Minneapolis and Seattle.

Common brick prices are higher in Atlanta, Birmingham and Montreal, but are lower in Kansas City. Roofing supply prices for slate-surfaced rolls are lower in Atlanta, Birmingham and St. Louis.

CEMENT, AGGREGATE, READY-MIXED CONCRETE—F.O.B. CITY

	PORTLAND CEMENT — Per bbl., C/L lots, incl. 40c. per bbl. for bags, cash dis. not deducted			SAND AND GRAVEL — Per ton, carload lots			CRUSHED STONE — Per ton, carload lots		CRUSHED SLAG — Per ton, carload lots, f.o.b. plant		CONCRETE BLOCK 8x8x16-in.; truckload del.; per block		CONCRETE Ready Mixed 1:2:4, over
	Cloth *a*	Paper	Bulk	Gravel, 1½ in.	Gravel, ¾ in.	Sand	1½ in.	¾ in.	1½ in.	¾ in.	Sand-grav.	Lt.wgt. Agg.	5½ c.y., del.
Atlanta	$2.77	$2.52	$2.47	$1.79	$1.89	$1.99	$1.79	$1.89	$1.59	$1.69	$0.17	....	$8.30
Baltimore	2.62	2.37	2.12	1.80‡	1.80‡	1.30‡	1.80‡	1.80‡	1.75‡	1.75‡	.125	$0.125*w*	7.45
Birmingham	2.50	2.25	2.10	1.75	1.75	1.50	.85	1.00	.90	1.15	.1425	....	5.80
Boston	2.97*b*	2.72*b*	2.52*b*	1.50‡	1.50‡	1.05‡	1.25‡	1.35‡	....	....	.13	.155*w*	7.55*m*
Chicago	2.90	2.65	2.50	2.15‡*d*	2.15‡*d*	2.15‡*d*	2.15‡*d*	2.15‡*d*	1.75‡	1.75‡	.18	.18*x*	....
Cincinnati	2.41	2.16	1.96	1.20	1.20	1.10	1.80	1.80	....	....	.12	.15*w*	6.70
Cleveland	2.49	2.24	....	1.75*i*	1.75*i*	1.55*i*	1.80*i*	1.80*i*	1.73‡*i*	1.73‡*i*	.14	.14	7.45
Dallas	2.51	2.26	2.06	1.50*p*	1.70*p*	1.10*p*	1.69*p*	1.79*p*	....	....	.15	....	7.15
Denver	3.08	2.88	2.32	1.20	1.30	1.25	1.65	1.75	1.00	1.00	.15	....	7.25
Detroit	2.49	2.24	2.09	1.50	1.50	1.30	2.25	2.25	2.00‡	2.00‡	.13	.14*w*	7.15
Kansas City	2.58	2.33	2.18	1.85	2.30	1.00	1.91	1.91	....	....	.125	.125*wy*	7.50*n*
Los Angeles	3.20*e*	2.60*e*	....	1.30	1.30	1.15	1.30*f*	1.30*f*	....	....	.04*bb*	.10*aa*	7.50
Minneapolis	3.07	2.82	....	1.00*h*	1.00*h*	.25*h*	1.00*h*	1.00*h*	....	....	.12	.16	7.55*j*
Montreal	....	1.95*rs*	1.79*rs*	1.65‡*s*	1.65‡*s*	1.50*t*	.80*ct*	.90*ct*	....	....	.1107*t*	.1107*wt*	7.85*u*
New Orleans	2.41	2.16	1.92	1.67	1.65	1.22	....	....	.90	1.15	.19	....	9.25
New York	2.85‡	2.60‡	....	1.60*de*	1.60*de*	.90*de*	1.70*de*	1.80*de*	....	....	.16	.14*wcc*	7.50*k*
Philadelphia	2.73	2.48	2.28	1.55‡	1.65‡	1.20‡	1.90	1.95	1.10	1.10	.155	.155*w*	8.45
Pittsburgh	2.70	2.45	2.25	1.65‡	1.65‡	1.85‡	2.25‡	2.25‡	1.50	1.50	.17	.17*z*	8.40
St. Louis	3.08	2.80	....	1.75‡	1.40‡	1.25/1.50‡	1.25*h*	1.25*h*	.90*g*	1.15*g*	.145	.13*w*	8.60
San Francisco	2.21	2.01	1.71	1.36	1.36	1.36	1.46	1.46	....	....	....	.21*y*	7.55
Seattle	....*u*	3.00*o*	....	2.35*d*‡	2.35*d*‡	2.35*d*‡	2.00*o*	2.00*o*	....	....	.16	.16*y*	7.25

‡ Delivered. *a* 10c. allowed for each returnable bag. *b* 10c. per bbl. off for cash. *c* F.o.b. quarry. *d* Per cu. yd. *e* Barge lots alongside docks. *f* Crushed granite. *g* F.o.b. Granite City, Ill. *h* F.o.b. plant. *i* Within three miles of Public Square. *j* 5% discount for cash. *k* Discount of 2 percent for each in 10 days. *l* Up to 200 cu. yd. *m* 50c. off for cash. *n* 25 c.y. or more. *o* 2% off for cash. *p* 10c. per ton off, cash 15 days. *r* 10c. per bbl. off, cash 20 days. *s* 8% sales tax included. *t* 8% sales tax not included. *u* Withdrawn. *v* 20c. per bbl. discount; 20c. allowed for returnable cloth bag. *w* Cinder. *x* Waylite. *y* Haydite. *z* Celocrete. *aa* Pumice. *bb* 4 x 8 x 12 in. *cc* Also 8 x 18 x 18 in.

CASH DISCOUNTS CEMENT to Contractors: truck delivery, 2% for cash on 10th of month; on carload deliveries, no trucking, same as dealer cash discount 10c. per bbl. for payment within 15 days of date of invoice. Subject discount 10c. per bbl. 20 days in Montreal.

CURRENT MAXIMUM PRICE BASES AT CEMENT MILL

Charge for bags no included. For cloth bags, add 40c. per bbl.; 10c. refund allowed for each returnable bag; for paper bags add 15c. per bbl., not refundable

	Bagged	Bulk		Bagged	Bulk		Bagged	Bulk
Buffington, Ind	$1.90	$1.85	Ironton, Ohio	$1.70	$1.65	Richard City, Tenn	$1.80	$1.75
Dallas, Tex	....	....	Limedale, Ind	....	....	Steelton, Minn	2.00	1.95
Hannibal, Mo	1.90	1.85	Norfolk, Va	....	....	Universal, Pa	1.75	1.70
Hudson, N. Y	....	....	Northampton, Pa	1.75	1.70	Waco, Tex. (Plus 9c. tax in Tex.)	1.75	1.70
Independence, Kans	1.70	1.65	North Birmingham, Ala	....	....	Montreal (8% sales tax incl.)	1.68	1.63
						Discount 10c. per bbl. 20 days		

PAVING BRICK, BLOCK, ASPHALT, ROAD OILS—F.O.B. CITY

	PAVING BRICK AND BLOCK — Granite per M lots of 50,000 4x4x8 in.	Brick per M 3x4x8½ in. carload lots	Wood per sq. 6d. 3½ in. 16-lb. treat	PAVING ASPHALT — Per ton, less than 80 penetration: Tank car	Drums	ASPHALT BINDERS—FLUXES — Per gal., 80-300 penetration: Tank car	Drums	CUTBACK ASPHALT — Per ton: Tank car	Drums	ROAD OIL — Per gal. Tank car	ASPHALT EMULSION (Quick-breaking) Per gal.: Tank car	Drums
Atlanta	$73.00	$39.35	$2.25	$18.53*e*	.....†	$0.0740*e*	.....†	$0.086*he*	.....†	$0.0781*e*	$0.0806	.....†
Baltimore	150.00‡	49.00	85.00*m*	15.00*r*	21.00*r*	.06*r*	.09*r*	13.00*r*	23.00*r*	.065*r*	.07*r*	.14*r*
Birmingham	150.00	32.00*j*	.....	17.95	.....†	.0747	.....†	.0834*h*	.....†	.065	.095	.....†
Boston	85.00	59.00	3.75	15.00	24.00	.0625	.115	17.00	30.00	.0625	.0825	.145
Chicago	150.00	55.00	2.50/2.80*d*	14.00	22.50	13.00*g*	21.50*g*	.0575*h*	.15*h*	.05*n*	.09/.10*n*	.13/.15*n*
Cincinnati	120.00	53.75	.....	17.00	.....	.085	.....	12.25	.....	.07	.085	.....
Cleveland	120.00	37.25	3.37*l*	17.00	19.00	.085	.095	.10*h*	.11	.08	.10	.....
Dallas	.....	36.00	.....	13.65	20.30	.06	.11	16.00	24.80	.06	.05/.07	.07/.09
Denver	.....	16.11	.....	11.00	.....	10.00	.....	.045*h*	.....	.....	.....	.....
Detroit	.....	37.00	.....	18.06*f*	25.60*f*	.0743	.128	.0718*h*	.119*h*	.067	.0775	.1149
Kansas City	.....	30.00	.....	18.50	23.50	.077	.1075	.077*h*	.107*h*	.057	.11	.15
Los Angeles	.....	50.00	.....	9.00*b*	23.00	9.50*bg*	24.00*bg*	9.50*b*	.....	.025	.072	.15
Minneapolis	.....	.....	2.30*d*	.....	27.70	.....	.126	.....	36.64	.....	.....	.....
Montreal	92.40	.....	.....	16.60*k*	24.25*k*	.116*k*	.1485*k*	.115*hk*	.135*hk*	.08*k*	.135*k*	.1885
New Orleans	.....	.....	.....	13.50*a*	20.00*a*	.057	.088	.06*h*	.095*h*	.....	.080	.....
New York	.....	65.00	.....	17.40	24.20*p*	14.00	.....	0725*h*	.1325*hp*	.....	.0725*p*	.119*p*
Philadelphia	140.00	58.00	4.06	15.00*r*	.....	14.00/15.00	.....	.0625*h*	.....	.....	14.00*gr*	.....
Pittsburgh	135.00	39.75	.....	18.00	23.00	.09	.16	20.00	36.00	.07	.06	.11
St. Louis	.....	39.00	.....	16.00	22.00	15.00*g*	21.00*g*	.0575*h*	.1212*h*	.648	.06	.11
San Francisco	.....	45.00	.....	10.90	21.15	10.90*g*	18.00*gr*	12.90	17.50*r*	9.50*gr*	.0525	.1125
Seattle	.....	.....	.....	10.90*i*	21.90*i*	.....	20.40*gi*	11.40*i*	.....	.....	.0525*i*	.0625

‡ Delivered. *a* F.o.b. Baton Rouge. *b* Delivered to purchaser's warehouse. *c* 3½x4x8¼ in. *d* 2½ in. 12-lb. treatment. *e* Local reduction due to 20% reduction intra-state class freight rates, only Georgia affected. *f* Mexican. *g* Per ton. *h* Per gallon. *i* F.o.b. Martinez. *j* 3x3½x8½ in. *k* Tax included. *l* F.o.b. Toledo. *m* Per thousand. † Available on priority only and quoted specially. *p* No sales drum shipments except to armed forces. *r* February 1943 prices, none later available.

In war or peace
B.F.Goodrich
FIRST IN RUBBER

Severe shrapnel wound

TIRES often have a short life at the battlefront. Machine gun fire and apnel riddle tires with holes. Rough ge tears casings and tubes to pieces. Before the war it used to be com- n practice to throw badly damaged s on the scrap heap. Then B. F. odrich men worked out improved thods for repairing large size tires h holes as big as your fist. First clean around the injury with a cial power-driven tool — just as a tist cleans the cavity in a tooth. In picture you see the careful prep- ion made for repairing.

lies of new cord material are ed to the inside of the tire to re- place the broken plies which were re- moved. New rubber is anchored to the outside, and the tread built up to the original surface. Then the entire repair is vulcanized into the body of the tire under high pressure and con- trolled temperature. After vulcanizing the tire is ready to go back into serv- ice with the repaired section prac- tically as strong as the rest of the tire.

Many thousands of tires have been repaired by this method both by Army men and by B. F. Goodrich men. Thousands of tons of critical materials have been saved from the scrap heap.

You can make your off-the-road tires provide many extra hours of service by giving them proper care and by having them repaired by factory meth- ods when necessary. Repair methods used by B. F. Goodrich were developed in the Akron factory and proved in actual service. Equipment and stand- ardized methods were then installed in convenient locations all over the country. No matter where you operate, there is a B. F. Goodrich dealer and he will see that they are quickly re- paired—by factory methods. *The B. F. Goodrich Company, Akron, Ohio.*

B.F. Goodrich
Truck & Bus Tires

IRON AND STEEL PRODUCTS—BASE MILL PRICES

	STRUCT. SHAPES-PLATE	REINF. BARS ¼-in. billet *b*	RIVETS ½-in. structural	WIRE NAILS Base *d*	SHEET PILING Base	STEEL RAILS Per Gross Ton Standard	Light	Re-rolled	TRACK SUPPLIES Angle Bars	Std. Spikes *c*	Tie Plates *c*	Track Bolts
Birmingham	$2.10	$2.15	$3.75	$2.90	.....	$43.00	$45.00	$45.00*	$2.70	$3.25	$2.30	$4.75
Chicago	2.10	2.15	3.75	2.90	$2.40	43.00	45.00	45.00*	2.70	3.25	2.30	4.75
Pittsburgh	2.10	2.15	3.75	2.90	2.40	43.00	45.00	45.00*	2.70	3.25	2.30	4.75
Buffalo	2.10	2.15	.....	.....	2.40	.....	.....	.....	....	....	2.30	....
Cleveland	2.10	2.15	3.75	2.90	.....	.....	.....	.....	....	....	....	....
Youngstown	....	2.15	.....	.....	.....	.....	.....	.....	....	3.25	....	....
Detroit	....	2.27‡	.....	.....	.....	.....	.....	.....	....	....	....	....
Gulf ports	2.47*a*	2.52*a*	.....	.....	2.85*a*	.....	.....	.....	....	....	....	....
Pacific ports	2.75*a*	2.80*a*	.....	3.40	2.95*a*	.....	.....	.....	....	....	....	....

‡ Delivered. *a* F.o.b. cars dock. *b* Rail steel same as billet prices. *c* Other basing points include Portsmouth, O., Weirton, W. Va., St. Louis, Kansas City, Minnequa, Colo., and Pacific coast ports, on tie plates alone, Steelton, Pa., on spikes alone, Lebanon, Pa., Richmond, Va. *d* Add switching charge $18 per c
• Per net ton.

IRON AND STEEL PRODUCTS—F.O.B. WAREHOUSE, PER 100 LBS., BASE PRIC

	STRUCTURAL SHAPES Per 100 lb. base price	REINFORCING BARS* Per 100 lb., ¼ in., base price 15 tons or over *b* New billet	Rail steel	Add Switch	$/cwt. for Del.	EXPANDED METAL LATH Per 100 sq. yd., carload lots Std. diamond mesh, 3.4 lb.	Std. ribbed 3.4 lb.	WELDED FABRIC REINFORCING Per 100 sq. ft., carload lots 4x16 in., No. 5 & 10 wires	4x12 in., No. 8 & 12 wires	6x6 in. No. 6 & 6 wires *k* Per 100 s. f.	SHEET PILING Per 100 lb base price
Atlanta	$2.34	$2.40	$2.40	$.02½	$.10	$21.06	$23.00	$1.82	$1.35	$1.91	$3.04
Baltimore	3.70	2.90	2.75	....	.10	22.50	24.50	1.70	1.27	1.79	3.00
Birmingham	2.10*a*	2.15	2.15	.02½	.10	19.00	21.00	1.80	1.34	1.89	....
Boston	3.912	3.994	....	$20 C.L.	.10	18.50	29.50	1.76	1.31	1.84	2.77
Chicago	2.10*a*	2.15*a*	2.15*a*	.03	.05	21.50	23.50	1.67	1.25	1.75	2.40
Cincinnati	3.68	2.53*cd*	2.53*cd*	....	.05	19.50	21.50	1.66	1.25	1.74	....
Cleveland	3.588*k*	3.10*k*	3.10*k*	.02½	.10	19.50	21.50	1.66	1.25	1.74	....
Dallas	4.25	3.17	3.17	....	....	25.50	27.50	1.93	1.42	2.03	....
Denver	4.57	3.33*k*	....	....	....	26.50	26.50	1.97	1.45	2.07	....
Detroit	3.661‡	2.50‡	2.50‡	....	.10	30.00	30.00	1.68	1.26	1.76	2.66
Kansas City	4.19	2.61*cd*	2.61*cd*	.0	.05	24.50	26.50	1.78	1.33	1.87	2.87
Los Angeles	3.65*f*	2.575	2.425	.02½	.05	23.00	27.50	1.93	1.42	2.03	3.65
Minneapolis	3.81‡	2.73	2.73	.0	.10	25.00	27.00	1.80	1.34	1.89	2.73
Montreal	3.95*i*	2.90*i*	2.80*i*	....	....	31.00*hi*	46.00*hi*	2.76	3.44*i*	.282*im*	....
New Orleans	4.229‡*k*	2.52	2.52	.05	.10	19.00	21.00	1.82	1.35	1.91	2.87
New York	3.75	2.76*e*	2.76*e*	....	.15	17.50	19.50	1.76	1.32	1.81	2.74
Philadelphia	3.666	3.668	....	....	....	20.50	22.50	1.71	1.28	1.79	2.72
Pittsburgh	2.10*a*	2.15*a*	2.15*a*	.02½	.10	23.00	26.50	1.59	1.20	1.67	2.40
St. Louis	3.697	2.74	2.74	.0	.05	28.00	34.00	1.69	1.27	1.78	2.70
San Francisco	4.35	2.825	2.675	.02½	.10	21.00	24.50	1.93	1.42	2.03	3.70
Seattle	2.75*e*	2.80*e*	....	....	....	34.50	38.50	1.93	1.42	2.03	2.95

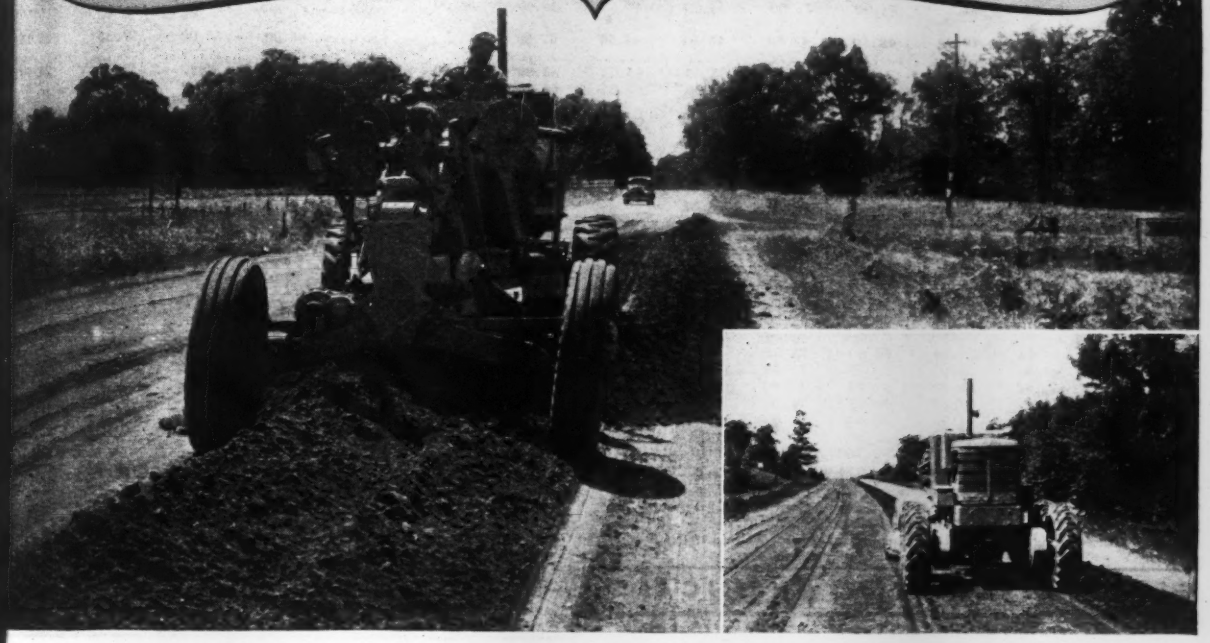
‡ Delivered. *a* Mill prices. *b* 5–15 tons, add 15c. 1–5 tons, add 25c. Less than 1 ton, add 50c. *c* 20 tons or over Base. *d* Mill price plus fr ight. *e* F dock. *f* Includes delivery in free delivery zone. *g* Less than 1 ton, add 25c.; 1 to 5 tons, add 10c. • High scrap steel prices cut former 15c. differences between billet and rail steel in many mills. *h* List price. *i* Plus Dominion and Province sales tax. *k* Quotation on changed basis; no actual price change. *m* Per sq.

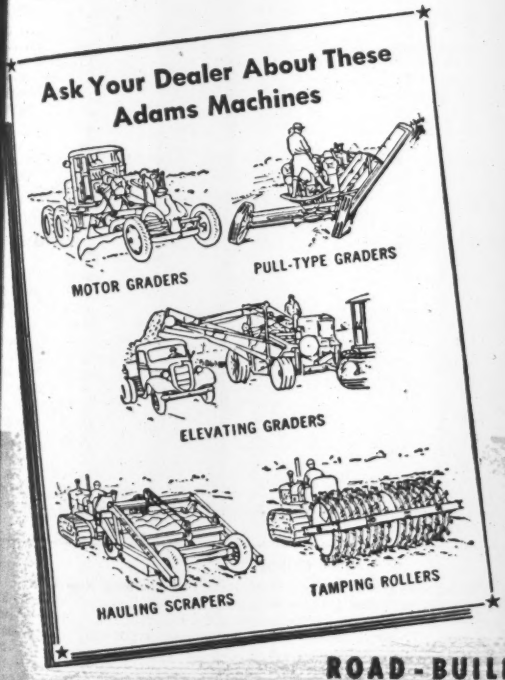
PLUMBING, HEATING, WATER, SEWER AND DRAIN PIPE

	C. I. PIPE Per net ton f.o.b. 6 in. to 24 in.*a*	VITRIFIED SEWER PIPE Per foot, std. 8 in., s.s.	Delivered, std. 12 in., s.s	ASTM 24 in.	C13–35 36 in.	CLAY DRAIN TILE Per 1,000 ft., carload lots, f.o.b. 6 in.	8 in.	CONCRETE SEWER PIPE Per ft., delivered; ASTM 12 in.	C 14–35 24 in.	WROUGHT STEEL PIPE Full standard weight, *h* 1 to 3 in., Butt Weld Black %	Galv. %	3½ to 6 in.; Lap W Black %	Galv. %
Atlanta	$50.66	$0.31*b*	$0.558*bc*	$3.082*e*	$5.70*c*	$110.00	$140.00	$0.45	$1.70	48.2	54.2	59.7	51.2
Baltimore	54.00	.35	.60	2.70	7.25	160.00	200.00	.60	1.85	65.5	57.5	63.0	54.5
Birmingham	46.00	.275	.495	1.95	5.50	100.00	220.00	.50	1.70	62.2	54.2	59.7	51.2
Boston	56.40	.371*r*	.7155*r*	2.79*r*	7.6875*r*	170.00‡*r*	265.00‡*r*	.60	1.95	....	....	....	....
Chicago	55.33	.35	.675	2.70	7.00	100.00‡	150.00‡	.45	1.85	66.0	55.0	64.5	53.0
Cincinnati	54.27	.231	.4455	1.80	5.125	105.00‡*s*	170.00‡*s*	.75*t*	1.75*t*	57.1	43.4	54.0	39.6
Cleveland	55.75	.245*r*	.4725*r*	2.115*r*	5.535*r*	90.60	139.40	.36	1.38	68.5	57.5	66.0	54.5
Dallas	57.43	.31	.58	2.25	5.00	90.00	110.00	.46	1.57	....	....	....	....
Denver	62.56	.29†	.52†	2.16†	3.00*n*	125.00	200.00	1.00	2.22	58.4	50.4	55.7	47.2
Detroit	55.75	.385	.7425	2.925	7.75	170.00‡*u*	263.00‡*u*	.36	1.75	57.6	44.0	54.5	40.2
Kansas City	56.73	.35	.59	2.20	6.20	140.00	260.00	.45	1.60	35.6	46.1	46.2	59.4
Los Angeles	69.40	.325†	.585†	2.70†	6.75†	130.50	217.50	1.00	2.00	61.1	50.1	58.6	47.1
Minneapolis	60.10	.305†	.549†	2.196†	6.25†	.....	.....	.90	2.10	64.2	53.2	60.7	49.2
Montreal	67.00	.85*o*	1.50*o*	5.25*p*	8.50*ep*	45.00*m*	64.00*m*	.48*m*†	1.92*m*†	....	....	....	....
New Orleans	52.78	.37*r*	.78	1.69	.....	150.00	220.00	.45	1.65	62.4	54.4	58.8	50.3
New York	53.40	.336	.648	2.835	6.97	.....	.....	.60	1.40	64.9	53.9	62.4	50.9
Philadelphia	52.00	.35	.675	2.75	7.50	165.00	225.00	.45	1.75	56.6	42.8	53.6	39.1
Pittsburgh	57.00	.266†	.513†	2.295†	5.945	97.80	154.20	.85*g*	2.00*g*	68.5*i*	57.5*i*	66.0*i*	54.5
St. Louis	55.62	.31	.504	2.016	4.50	90.80	220.00	1.00*j*	2.15*k*	56.4	42.6	52.5	38.4
San Francisco	69.40	.3625*d*	.6525*d*	2.61	6.52	115.00	192.50	.58	2.34	45.0	31.0	41.0	26.0
Seattle	71.20	.40	.72	2.88	7.20	115.20	.....	.51*f*	1.44*f*	....	....	....	....

‡ Delivered. † F.o.b. *a* B. & S. class B and heavier, C/L lots, 200 tons and over Burlington, N. J. (base) $50.00 Based on existing freight rates; subject to rate change. Gas pipe and class A, $3 per ton additional, 4 in., $3 per ton additional, 30 in. and larger usually $2 per ton less. *b* Double strength. *c* List to dealer. *d* List. *e* 30-inch. *f* Less 5% for cash. *g* Culvert pipe. *h* Discounts from standard list consumers carload prices, except Pittsburgh prices are f.o.b. mill. Base price $200 per net ton. List prices per ft.; ¼ in., 8¼c.; ⅜ in., 11¼c.; 1 in., 17c.; 2 in., 37c.; 2½ in., 58½c.; 3 in., 76½c.; 4 in., $1.09; 6 in., $1.92; 3 per cent tax on transportation costs not included. *i* Applies also at Lorain, Ohio, mills. Chicago delivered base is 2½ points less on butt, 1½ on lap. Freight is figured from Pittsburgh, Lorain, O., Chicago Dist. Billing is from p producing lowest price at destination. WROUGHT IRON PIPE: Base and list prices per ft. same as wrought steel pipe. Discount for Pittsburgh Butt-weld—1 in. and 1¼ in. black 34, galv. 16; 1½ in. black 38, galv. 18; 2 in. black 37½, galv. 18. Lapweld—2½ in. to 3½ in. black 31½, gal. 14; 4 in. 8 in. black, 32½ galv. 17. *j* Reinforced; spec. C 76–37. *k* Reinforced; C 75–37. *l* Plus sales tax. *m* Tax included. *n* 27-in. pipe. *o* Less *p* Less 53%. *r* Truck delivery. *s* Price quotations on delivered basis since 1940; current f.o.b. price $84 for 6 in.; $130 for 8 in. *t* Reinforced pipe since May, 1937; current plain pipe prices are: 12 in., 36c.; 24 in., *u* Scarce: carload quantities not readily available.

Speed Road-Mix Operations with ADAMS MOTOR GRADERS





★ THREE IMPORTANT FEATURES combine to make Adams Heavy-Duty Motor Graders outstanding favorites for all types of road-mix work—scarifying, mixing, spreading:

1. The abundance of power and traction it takes to move large windrows of heavy materials . . . easily!
2. 8 overlapping forward speeds which provide the proper speed for fast mixing action in any material.
3. The positive, rigid blade control needed for uniform spreading, insuring smooth surface finishes.

You'll find husky, high-speed Adams Motor Graders ideal for all manner of surface, ditch and bank work—providing fast, economical construction and maintenance operations on roads, airports and similar projects. See your nearest Adams dealer for complete details.

J. D. ADAMS MANUFACTURING CO.
INDIANAPOLIS, INDIANA
Sales and Service Throughout the World

ADAMS

ROAD-BUILDING AND EARTH-MOVING EQUIPMENT

LUMBER, TIMBER PLYWOOD—PER M FT., B.M., CARLOAD LOTS F.O.B.

	SHORT LEAF YELLOW PINE AND DOUGLAS FIR— All S. L. Y. P. is No. 2 common or better end for No. 1 N. C. Box. (Prices in Bold Face) *All Fir planks No. 2 common, Fir timber is No. 1 common. Lengths up to 20 ft. (Prices in italics)*									LONG LEAF Y. P. Merchantable grade up to 20 ft.		PLYWOOD Rail freight increment (See note for base price)	
	1x6 S4S	1x8 S4S	2x4 S4S	2x6 S4S	2x8 S4S	2x10 S4S	3x12 Rgh	6x12 Rgh	12x12 Rgh	2x12 Rgh	12x12 Rgh	¼"	¾"
Atlanta	**$40.00**	**$40.00**	**$32.00**	**$35.00**	**$34.00**	**$37.00**	**$46.00**	.....	.....	$57.00	$64.00	$17.90	$21.85
Baltimore	**44.00**	**46.00**	**44.00**	**46.00**	**47.00**	**52.00**	**65.00**	.....	.....	115.00	120.00	18.25	22.25
	48.00	*49.00*	*55.00*	*55.00*	*55.00*	*57.50*	*68.00*	*$75.00*	*$75.00*	.....	.....	.....	.....
Birmingham	**45.00**	**45.00**	**44.50**	**43.50**	**44.50**	**47.50**	**68.00**	**55.00**	**56.00**	.....	.....	17.35	21.15
[1]	50.00	50.00	49.50	48.50	49.50	52.50	72.00	.....	.....	67.50	70.00	.....	.....
Boston	60.00[3]	60.00[3]	60.00[3]	60.00[3]	60.00[3]	62.00[3]	66.00[3]	.....	.....	58.00[3]	68.00	18.25	22.26
	55.00	*55.00*	*54.00*	*54.00*	*54.00*	*54.00*	*58.00*	*58.00*	*58.00*	.....	.....	.....	.....
Chicago	**54.00**	**54.00**	**55.00**	**54.00**	**54.00**	**60.00**	**68.00**	.....	.....	80.00*l*	95.00*l*	14.60	17.80
	55.00	*55.00*	*54.00*	*54.00*	*54.00*	*55.00*	*56.00*	*56.00*	*57.00*	.....	.....	.....	.....
Cincinnati	**47.50**	**49.00**	**42.50**	**42.50**	**42.50**	**44.50**	**67.00**	.....	.....	65.00	65.00	17.35	21.15
	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Cleveland	**42.50***k*	**42.50***k*	**52.50***k*	**51.00***k*	**65.00**	**65.00**	**83.00**	**83.00**	**83.00**	.....	.....	17.75	21.60
Dallas *e*	**45.25**	**45.25**	**44.50**	**43.00**	**43.00**	**47.25**	**60.75**	**58.75**	**58.75**	**88.75**	**85.00**	**14.60**	17.80
Denver ‡	63.50[4]	62.00[4]	65.00[4]	65.00[4]	65.00[4]	66.00[4]	69.00[4]	*83.00*	*89.00*	.....	.....	10.45	12.70
Detroit	**61.00**	**61.00**	**57.75**	**57.75**	**57.75**	**63.75**	**71.00**	.....	90.00	70.75	90.00	17.35	21.15
	57.00	*57.00*	*57.00*	*57.00*	*62.75*	*72.75*	*75.00*	*75.00*	*90.00*	.....	.....	.....	.....
Kansas City *a*	**69.00**	**69.00**	**67.00**	**65.50**	**67.00**	**69.00**	**84.00**	.....	.....	84.00	94.00	12.60	15.40
	66.00	*66.00*	*59.50*	*59.50*	*59.50*	*59.50*	*75.00*	*80.00*	*80.00*	.....	.....	.....	.....
Los Angeles *a*	*60.00*	*60.00*	*60.50*	*60.75*	*59.25*	*59.25*	*72.75*	*72.00*	*72.00*	.....	.....	9.90*gh*	12.06*gh*
Minneapolis *b*	59.00[8]	59.00[8]	.....	.....	.....	.....	.....	.....	.....	.....	.....	12.60	15.40
‡	*58.00*	*69.00*	*60.00*	*61.00*	*59.00*	*60.00*	*66.00*	*65.00*	**65.00**	.....	.....	.....	.....
Montreal †[7]	*58.00*	*61.00*	*56.00*	*63.00*	*61.00*	*70.00*	.....	.....	.....	200.00	200.00	.....	.....
	54.00	*54.00*	*57.00*	*57.00*	*57.00*	*68.75*	*80.00*	*80.00*	*80.00*	.....	.....	.....	.....
New Orleans	**40.00**	**40.00**	**37.00**	**35.00**	**34.00**	**36.00**	**46.00**	.....	.....	55.00	69.00	14.60	17.80
	31.00	*31.00*	*33.00*	*31.00*	*34.00*	*32.00*	*33.00*	.....	.....	.....	.....	.....	.....
New York	**67.50**	**67.50**	**62.50**	**62.50**	**62.50**	**64.00**	**74.00**	.....	.....	120.00*f*	125.00*f*	18.35	22.25
‡	.....	.....	*65.00i*	*65.00i*	*65.00i*	*65.00i*	[Range from $75 to $95]			.....	.....	.....	.....
Philadelphia	**75.00**	**75.00**	**75.00**	**75.00**	**75.00**	**75.00**	**75.00**	.....	.....	130.00	130.00	18.25	22.25
	75.00	*75.00*	*75.00*	*75.00*	*75.00*	*75.00*	*85.00*	*90.00*	*90.00*	.....	.....	.....	.....
Pittsburgh	**50.80**	**53.20**	**62.75**	**55.00**	**60.85**	**62.50**	**76.25**	.....	.....	.....	.....	18.10	22.05
	69.20	*68.10*	*66.10*	*65.30*	*65.20*	*65.65*	*82.75*	*88.75*	*88.75*	.....	.....	.....	.....
St. Louis ‡ *c*	**61.00**	**61.00**	**57.00**	**56.00**	**57.00**	**59.00**	**71.00**	*75.00*	*75.00*	87.00	87.00	14.60	17.80
San Francisco *d*	*41.00*	*41.00*	*36.50*	*36.75*	*35.75*	*35.75*	*37.50*	*36.00*	*36.00*	.....	.....	7.30*g*	8.90*g*
Seattle	*51.25*	*51.25*	*45.75*	*45.75*	*44.50*	*44.50*	*47.00*	*47.75*	*46.50*	.....	.....	0.00	0.00

Bold Face type, Southern Pine. *Italics, Douglas Fir.* [1] Long leaf. [2] Roofers N. C. Pine. [3] Spruce. [4] Native. [5] Western Pine, No. 3 Common. [7] Spruce. [8] Norway Pine. ‡ Delivered. *a* Yard prices. *b* Contractors discount in Minneapolis and St. Paul discontinued May 21, 1938. *c* 5M ft. or less. *d* F.o.b. cars San Francisco freight rate. *e* 10% discount taken off. *f* Up to 18 ft. † Plus sales tax.

Note: Special concrete form grade Fir Plywood, 4' by 8' panels; 5-ply, sanded 2 sides, water resistant glue, carload lots, delivered per 1,000 sq. ft. surface Seattle base price on ⅝", $95.15; on ¾", $104.85; price includes oiling and sealing charges. For other centers add rail freight increment from table or propo size. For resin dipped treatment, add $10.50 per M. *g* Lower rate by wat shipment. *h* 50,000 lb. minimum. *i* Ranges from $65 to $75. *j* Average pric *k* August 1943 price. *l* September price; none later available.

GLASS, EXPLOSIVES, CHEMICALS

	WINDOW GLASS Discounts from jobbers list, Aug. 15, 1938 Single or Double Thickness A quality	B quality	EXPLOSIVES Per lb. 40% Ammonia Gelatin in 50-lb. cases delivered in 200 lb. lots*	
Atlanta	74%	75%	$0.15	
Baltimore	78%	79%	.15	
Birmingham	76%	76%	.105	
Boston	77%	78%	.15	
Chicago	77%	77%	.15	
Cincinnati	77–10%	77–10%	.15	Price of 60% Ammonia Gelatin in $0.01 per lb. higher than 40%
Cleveland	77%	77%	.19	
Dallas	76%	76%	.1625	
Denver	76%	76%	.155*e*	
Detroit	77%	77%	.1575	
Kansas City	77–10%	77–10%	.155	
Los Angeles	86%*d*	88%*d*	.1575	
Minneapolis	77%	77%	.155	
Montreal	40–5%*ab*	47%*ac*	.1675†	
New Orleans	70%	75%	.16	
New York	81%	82%	.22*f*	
Philadelphia	78%	79%	.15	
Pittsburgh	79%	79%	.1225	
St. Louis	77–10%	77–10%	.155	
San Francisco	66%	73%	.155	
Seattle	75%	75%	.1575†	

a Discount from list Sept. 1939; sales tax included, but 6% tax exemption not allowed for. *b* Single thickness. *c* Double thickness. *d* Discount from jobbers' list Sept. 15, 1928.

* Urban prices influenced by service charges or local storage and delivery regulations, do not consistently reflect quantity prices in less congested areas. *e* F.o.b. Louviers, Colo. *f* In boroughs of Kings, Queens and Richmond, and in Manhattan south of Canal St. add delivery charge of $6.00 per trip. [1] F.o.b.

40% Ammonia Gelatin price ranges in other than urban areas, per lb. (except Seismograph Grades)

	C/L 20,000 lb. net	Tons	200 lb. lots
E. of the Miss., except Fla. and Me.	$0.105	$0.13	$0.15
W. of Miss. to Rocky Mtn. States, Fla. and Maine.	.11 –.1175	.135 –.1475	.155 –.1675
Rocky Mtn. States	.11 –.1225	.135 –.1525‡	.155 –.1725‡
Pacific N. W. States	.1075–.12	.1375–.15	.1575–.17
Pacific S. W. States	.1050–.1125	.135 –.1425	.155 –.1625

‡ F.o.b. Louviers, Colo., or Butte, Mont.

PILES TIES— F.O.B.

PILES

Prices per linear foot, fir and pine, bark on, f.o.b. cars, New York. Fir ba on Wash. and Ore. points to New York shipping area; pine based on freight fr Norfolk.

Dimensions	Points	Length	By Rail— Pine*	Fir
12-in. at butt	6-in.	30 to 50-ft.	$0.34	.....
12 in.— 2 ft. from butt	6-in.	50 to 59-ft.	.35	.....
12-in.— 2 ft. from butt	6-in.	60 to 69-ft.	.36	.....
12-in.— 2 ft. from butt	6-in.	90 to 100-ft.	....	.5575
13-in.— 3-ft. from butt	5-in.	91 to 100-ft	....	.5608
14-in.— 2-ft. from butt	6-in.	50 to 69-ft.	.41	.6175
14-in.— 2-ft. from butt	6-in.	70 to 79-ft.	.43	.59
14-in.— 2-ft. from butt	5-in.	80 to 85-ft.	.54	.....
14-in.— 2-ft. from butt	5-in.	85 to 89-ft.	.57	.....
14-in.— 2-ft. from butt	5-in.	90 to 100-ft.	....	.60

* Pine piling over 80-ft. available only in limited quantities.

RAILWAY TIES

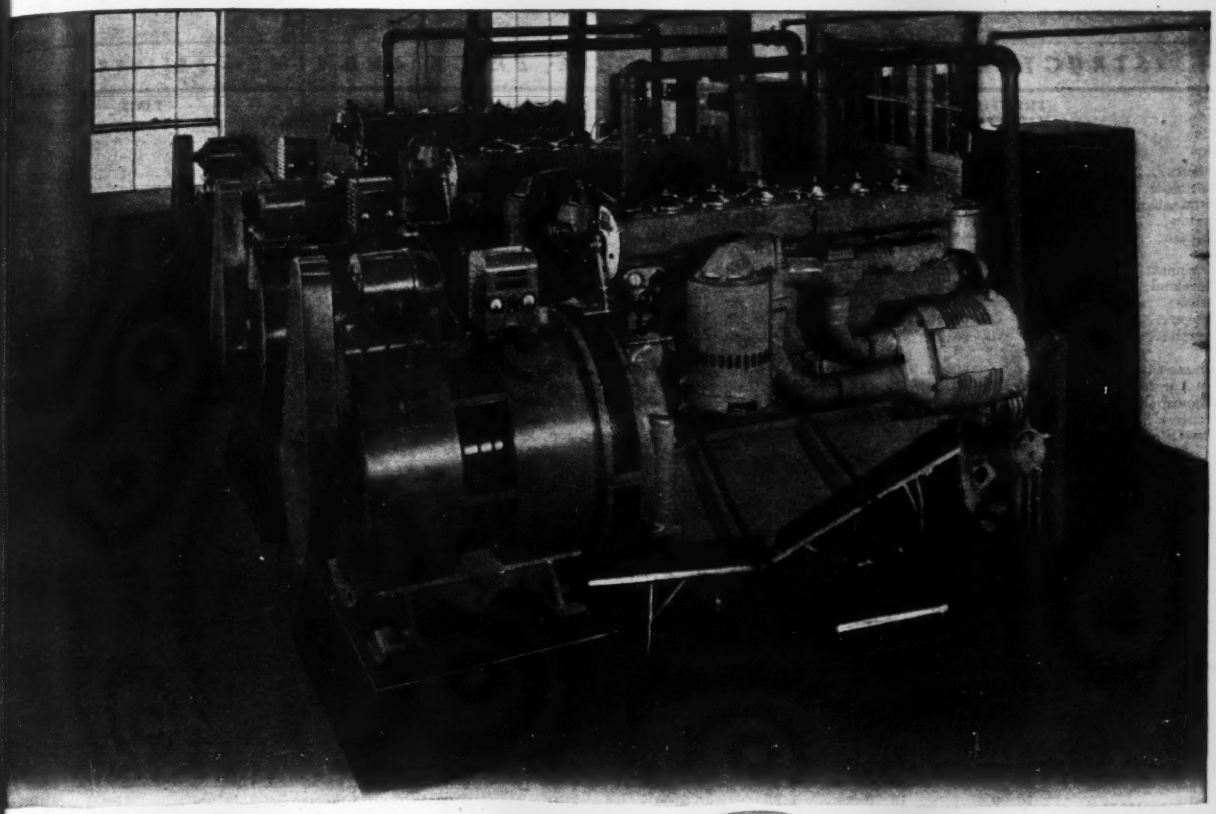
Prices f.o.b., per tie for carload lots:		6"x8"x8' Untr.	6"x8"x8' Tr.	7"x9"x8'6" Untr.	7"x9"x8'6" Tr.
Boston	Oak	$1.50	....	$2.00	....
	Pine	2.00	$3.00*a*	2.50	$3.00
New York	S. L. Sap Pine	1.43/1.54	2.59	1.76	2.98
	Mixed Oak	1.71	2.59	2.42	3.58
Birmingham	White Oak	1.00	1.60*a*	....	2.25
Chicago	Red Oak	....	2.00/2.25*a*	....	2.87/3.0
Los Angeles	Douglas Fir	2.00	3.25*a*	2.90	4.70
Philadelphia	Red Oak	....	2.10*ag*	....	3.25
St. Louis	White Oak	1.63	....	2.19	....
	Red Oak	1.63	2.20*a*	2.19	3.04
	Sap Pine or Cypress	1.70	....	2.06	....
San Francisco	Douglas Fir	1.25*bcf*	....	....	3.00
Montreal	Birch or Maple	.85	.90	....†	....

Tr.— Treated; Untr.— Untreated. *a* Creosoted. *b* 6"x8"x8'6". *c* Empt cell. *d* Zinc. *e* Green. *f* F.o.b. cars. † Out of market. *g* January 1943 pric none later available.

CHEMICALS

Water, sewage treatment, road work, f.o.b. carlots, New York

Bleaching powder, in drums, f.o.b. works, per 100-lb	$2.50– 3.
Chlorine cylinders, liquid, per lb., delivered	.05
Calcium chloride, 77–80%, flaked, 100-lb. paper bag, del'd, ton.	18.50–35.
Silicate of soda, 52 deg. in drums, f.o.b. works, per 100 lb	1.
Soda ash, 58%, in paper bags, per 100 lb. dense	1.
Sulphate of aluminum, commercial, in 100-lb. bags, per ton	23.00–25.
Sulphate of copper, in bbl., per 100-lb	5.



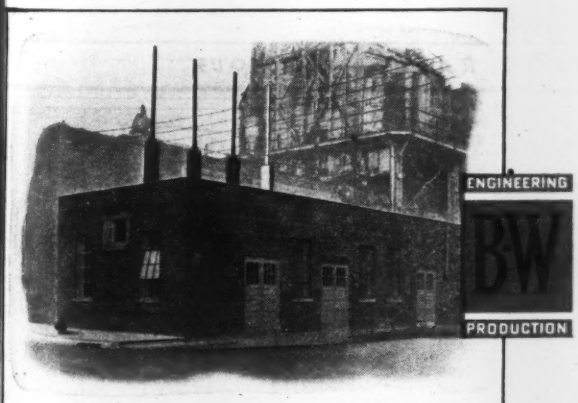
More Power for the Same Space Because of Supercharging

Industries bulging with war orders needed more power than the municipal plant at Hartford, Wisconsin could supply.

To meet the problem, Hartford Utilities purchased three Murphy Diesel Generating sets. In order to get the maximum performance and flexibility from the investment and in the space available, these engines were engineered with B-W Superchargers, for a combined capacity of 345 KW.

B-W Supercharging increases engine performance and flexibility without corresponding increase in size because it delivers more air to cylinders than the pumping action of the pistons would normally draw in. More fuel can be burned, and more power developed.

Each passing month furnishes additional evidence of the value of B-W Supercharging for providing more power in a given space . . . to compensate for loss of power at higher altitudes . . . to improve performance of marine, industrial, transportation, and automotive engines, both gasoline and diesel.



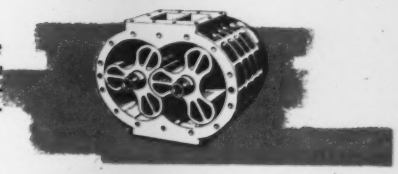
In this corner building, three Murphy Diesels, as shown by the three blackened stacks, occupy only 44 square feet of floor space each, to develop 345 KW.

SUPERCHARGERS, INC.

3410 WEST CAPITOL DRIVE

DIVISION OF BORG-WARNER

Milwaukee 9, Wisconsin



B-W Positive Displacement Superchargers supercharge at all speeds and in proportion to the need of the engine for air.

STRUCTURAL CLAY BUILDING TILE, BRICK AND LIME—DELIVERED

	STRUCTURAL CLAY TILE PARTITION—SCORED Per M lots of 2,000 pieces or over,			STRUCTURAL CLAY TILE—LOAD BEARING—SCORED Per M lots of 2,000 pieces or over,			BRICK Per M in quantity		LIME		
	3x12x12 in.	4x12x12 in.	8x12x12 in.	8x12x12 in.	10x12x12 in.	12x12x12 in.	Common backing	Straight hard	Per ton, Hydrated finishing	In paper, Common hydrated	Carload lot, Pulverized, or lump
Atlanta	$104.00	$114.00	$199.00	$234.00	$244.00	$250.00	$18.25	$20.04	$26.54	$15.04	$15.04
Baltimore	84.00	90.00	170.00	200.00	260.00	300.00	16.75*k*	20.75*k*	19.00	14.00	2.50*m*
Birmingham	80.00	85.00	160.00	191.00	252.00	288.00	16.50	23.00	18.11	13.64	2.25*o*
Boston	103.75*a*	110.65*a*	207.45*a*	248.90	.....	.....	20.00*i*	20.00*i*	21.00†	.....	16.00
Chicago	79.50	85.00	160.00	197.00	243.00	278.00	15.00	16.00	17.00	15.00	12.50
Cincinnati	65.55	69.90	131.20	148.70	210.35	240.45	25.75	25.75	15.50	13.00	.....
Cleveland	82.50	97.35	182.50	.....	.....	.....	20.00	20.00	15.75*j*	13.25*j*	3.00*n*
Dallas	71.40	76.70	145.30	183.50	238.00	294.50	15.25*i*	16.75*i*	19.00	15.00	15.00
Denver	84.80	95.40	153.70	178.20	212.00	227.90	14.50	18.00	25.00*j*	17.00*j*	20.00*j*
Detroit	92.70	96.70	174.50	198.80	257.20	294.30	20.50	20.50	18.00	16.00	16.00
Kansas City	67.00	69.00	89.00*e*	128.00	163.00	189.00	14.00	16.00	19.32	13.00	10.92
Los Angeles	73.50†*r*	89.50†*r*	128.00*e*†*r*	210.00†*r*	368.00†*r*	460.00†*r*	13.50	15.00	16.50	17.50	17.50
Minneapolis	87.00*b*	92.80*b*	157.30*b*	.....	189.00*b*	262.00*b*	25.50	27.50*g*	21.00	16.00	19.00
Montreal	94.55*a*	100.45*a*	199.50*a*	160.45*a*	109.40*at*	137.40*au*	23.80†*u*	33.02†*u*	24.60*u*	17.10*u*	20.00*u*
New Orleans	72.00	72.00	135.00	162.00	210.00	260.00	14.00	.....	18.30	12.08	14.10
New York	90.80	96.80	133.10*c*	219.80*h*	269.80*h*	333.90*h*	17.50/18.50	.....	20.00	14.00	17.00
Philadelphia	104.20	111.20	208.40	250.10	305.10	377.70	18.75	21.75	19.00	16.00	15.00
Pittsburgh	74.20	79.15	148.40	233.00	284.00	325.00	20.50	22.50	17.90	15.40	2.55*m*
St. Louis	67.00	72.00	130.00	190.00	244.00	290.00†	20.50	19.50	22.00	18.00	2.50*m*
San Francisco	96.00	108.00	144.00	108.00*t*	.....	.....	21.50	.....	24.00	23.00	2.50*m*
Seattle	115.00	125.00	230.00	.....	.....	.....	20.50*f*	24.00*f*	20.00*s*	20.00*s*	20.00*s*

† F.o.b. *a* Smooth. *b* Carload lots delivered to job. *c* 6x12x12 in., 3-cell. *d* Not load bearing. *e* 48 lb. tile. *f* LCL. *g* Selected common. *h* F.o.b. Perth Amboy, N. J. *i* F.o.b. Warehouse only. *j* Less $1.00, ½ cash 15 days, balance 30 days. *k* $1.00 discount if paid in 10 days. *l* Lump. *m* Per bbl., 180 lb. *o* Per bbl., 200 lb. *p* 280 lb. bag. *r* 5% discount 10 days. *s* 2% discount for cash. *t* 5½x8x12. *u* 8% sales tax included. *v* 6x12x12-in. *w* Per 200 lb. bag.

PAINT, ROOFING—F.O.B. CARLOAD LOTS

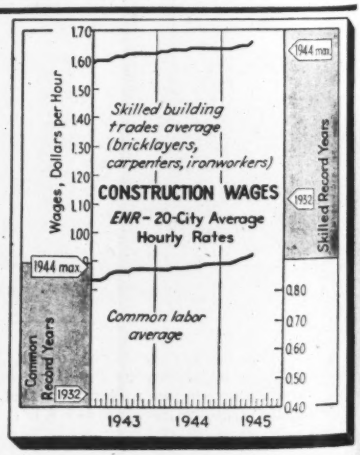
	RED LEAD Per 100 lb. in 600-lb. (Approx.) bbl. Dry *a*	WHITE LEAD Per 100 lb. in oil	READY-MIXED PAINT Per gal., drums Graphite *b*	Aluminum *b*	Ferric Oxide *d*	ROOFING SUPPLIES Rolls, slate surfaced, 85–90 lb. per sq.	Asphalt felt, per 100 lb.	Carload lots f..o.b.. factory Tar felt, per 100 lb.	Asphalt coating per gal.	Tar pitch 350 lb. bbl. per ton
Atlanta	$10.25	$14.125	$1.30	$2.25	$1.20	$1.85	$1.72	$1.72	$0.305	$27.00
Baltimore	10.00	13.75	2.00	3.00	2.50	2.30	2.70	2.70	.40	29.00
Birmingham	10.25	14.125	2.35	3.50*r*	1.98*r*	2.09	1.98	1.98	.32	28.35
Boston	10.00	13.75	1.75	2.50	2.31	2.00‡*h*	3.30‡*u**v*	3.30‡*u**v*	.25‡	21.00‡
Chicago	10.00	13.75	....	....	....	1.75*hf*	1.74*hf*	1.82*hf*	.33*f*	23.00*f*
Cincinnati	10.00	13.75	1.70	2.90	1.60	2.20	2.10*h*	2.10*h*	.33	25.00
Cleveland	10.00	13.75	1.70	2.90	1.60	1.71	1.63*h*	1.63*h*	.237	25.00
Dallas	10.00	14.50	1.88	2.11*n*	.05*l*	1.75*h*	1.66*h*	1.66*h*	.35	39.00
Denver	10.50	14.25	....	....	.27*l*	2.45	2.95	2.95	.35	28.00
Detroit	10.00	13.75	1.75	3.00	1.60	2.25	2.25	2.25	.50	23.00
Kansas City	10.00	13.875	2.30*g*	2.55*gr*	2.16*g*	2.19	2.30	2.30	.28	27.50
Los Angeles	10.25	14.25	1.60	2.25	2.30	2.10	1.50	....	.45	.....
Minneapolis	10.00	13.875	....	....	....	1.8025*i*	1.7098*hi*	1.7098*hi*	.32	23.00
Montreal	.....	11.05	2.50*p*	4.90*p*	3.15*p*	4.02*t*	2.58*t*	3.01*t*	.89*t*	2.10*kl*
New York	10.00	13.75	2.03	....*r*	1.82	1.7098	1.6273*a*	1.6273*o*	.26	23.00
Philadelphia	10.00	13.75	1.60/1.80	2.20*r*	1.55	2.25	2.71	2.71	.32	23.00
Pittsburgh	10.00	13.75	1.05	1.95	.80	1.95	1.84*h*	1.84*h*	.34	26.00
St. Louis	10.00	13.75	2.28*s*	2.89*s*	1.96*s*	1.92	1.66	1.66	.36	24.00
San Francisco	10.25	14.00	1.80	2.75*n*	1.35	1.71	2.40	2.40	.33	20.50
Seattle	10.25	14.25	1.90	3.00	....	2.15	2.16*h*	....	.35	26.50*j*

‡ Delivered. Note: Red lead in oil 50c. higher than white lead in oil. *a* Red lead prices change frequently due to pig lead price changes. *b* U. S. War Dept. Spec. 3-49A. *c* ASTM Spec. D266-31. *d* 80% minimum ferric oxide. *e* Subject to 25% discount. *f* Distributors' price to contractors. *g* 5 gal. can. *h* Per roll, 65 lb. *i* Minneapolis and vicinity. *j* Asphalt pitch. *k* Per 100 lb. *l* Per lb. *m* Per bbl. *n* May, 1941 price. *o* 60-lb. roll. *p* Plus 8% sales tax. *r* Not available, except on priority rating; then quoted specially. *s* December 1942 price. *t* Federal tax included. *u* 90-lb. roll. *v* Truck delivery.

SKILLED AND COMMON WAGE RATES—PER HOUR

	Bricklayers	Carpenters	Struct. Iron Workers	Hoisting Engineers	Plasterers	Common Labor Building	Common Labor Heavy Const.
Atlanta	$1.50	$1.25	$1.50	$1.25	$1.50	$0.40	$0.50
Baltimore	1.75	1.4375	1.80	1.625/2.00	1.725	.80	.80
Birmingham	1.75	1.25	1.625	1.375 /1.625	1.65	.65	.65
Boston	1.625	1.50	1.675	1.50 /1.875	1.667	1.00	1.00
Chicago	1.90	1.70	1.76	1.75	1.825	1.20	1.20
Cincinnati	1.825	1.60	1.725	1.45 /1.60	1.75	.90	.90
Cleveland	1.875*c*	1.575	1.875	1.875	1.875	1.085	1.125/1.155
Dallas	1.625	1.25	1.50	1.75	1.625	.60	.75 /1.25
Denver	1.65*b*	1.50*b*	1.50*b*	1.50 /1.625*b*	1.50/1.65	.80*b*	.80*b*
Detroit	1.725	1.50	1.825	1.675/1.825	1.725	1.00	1.00
Kansas City	1.75	1.50	1.625	1.675	1.70*a*	.975	.90
Los Angeles	1.50	1.35	1.625	1.375	1.667	.875	.875
Minneapolis	1.625	1.44	1.625	1.50	1.625	.95	.95
New Orleans	1.625	1.375	1.625	1.55	1.50	.70	.80
New York	2.00*b*	1.85*b*	2.00	2.00*b*	2.00*b*	1.10	1.10
Philadelphia	2.00	1.58	1.90/2.00	2.25	2.00	.90	.90
Pittsburgh	1.90	1.75	1.75	1.8125	1.875	1.00	.90
St. Louis	1.90	1.75	1.75	2.00	1.75	1.00	1.00
San Francisco	1.875	1.50	1.75	1.50/1.75	1.75	1.00	1.00
Seattle	1.845	1.545	1.745	2.00	1.845	1.145	1.145
Montreal*	1.06	.96	1.00	.90	1.06	.61	.66

a Increases to $1.75 July 1st. *b* 7 hr. day. *c* Prevailing rate on government work. • Cost of living bonus now including in basic wage.



ENR Skilled Average: (Bricklayers, Carpenters, Ironworkers) $1.661.
ENR Common Average: $0.916.

el, Price, Calla-
used 30-foot
acrane to set
asoline and fuel
orage tanks at
o Canol, near
McKenzie River.

TOURNACRANES travel with maximum loads on and off-road

. . . give you truck crane service at lower first cost and lower operating cost

You will find the Tournacrane's ability to travel, carrying maximum loads, gives you a definite advantage over ordinary truck cranes on your heavy-lifting jobs. These mobile cranes eliminate need for outriggers or side and end jacks. Big 5′ 6″ diameter tires provide ample flotation to move bulky loads in soft material where small-tired truck cranes bog down. Easily maneuvered in hard-to-get-at spots.

One-man operated

Tournacranes are operated by one man. A standard LeTourneau Power Control Unit, mounted at the rear of the Tournapull seat, provides accurate, independent boom-hoist and load-line control.

Low-cost lifts

At exceptionally low equipment investment and reduced operating costs, Tournacranes economically load and unload flat cars, erect structural steel, assemble and place heavy machinery, culverts, foundation and bridge steel, transmission line poles and towers.

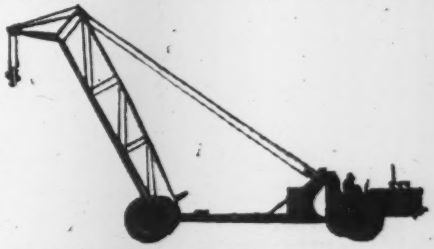
When not in use, the Tournapull prime mover can be transferred to Scraper or hauling units; only the few thousand dollars invested in the Crane stand idle.

You can get complete information on Tournacranes and other LeTourneau construction rigs from your local LeTourneau distributor. Ask him for new 24-page complete line catalog . . . or write to R. G. LeTourneau, Inc., Dept. ENR645, Peoria, Ill. Do it NOW.

SPECIFICATIONS

TC30 Tournacrane with 150 h.p. Super C Tournapull

Capacity	20,000 lbs.*
Lift	30′
Boom Reach (upright position)	9′ 6″
Tires:	
Tournacrane	2(21 x 24)16
Tournapull	2(21 x 24)16
Overall Dimensions:	
Length, upright	33′ 6″
Width, rear wheels	12′ 6″
Height, upright	33′ 3″
Approx. Weight complete	24,450 lbs.
Trovel speed	to 14.9 m.p.h.



*Other fast-moving, rubber-tired Tournacranes are available with lifting capacities up to 50,000 lbs. . . . lifting heights from 20 to 40 feet . . . 8 to 21′ boom reach (upright position) depending on Tournacrane model.

C 27

ME TOURNAPULL PRIME MOVER AND PCU INTERCHANGEABLE FOR USE WITH:

15-heaped-yard Carryall* Scraper, to load, haul and spread.

Tournatrailer* . . . powerful rear-dump haul unit . . . 17 heaped-yard capacity.

Flat-bed Tournatruck* . . . for off-road hauling of materials and machinery.

LETOURNEAU TOURNACRANES*

PEORIA, ILLINOIS , STOCKTON, CALIFORNIA

*Trade Mark Reg. U. S. Pat. Off.

CONTRACT UNIT PRICES

What contractors are bidding on different kinds of construction work

CANALS AND LATERALS, MISSOULA VALLEY PROJECT, MONT.

OWNER: Bureau of Reclamation, Hamilton, Mont.

PROJECT: Construction of earthwork and structures, Big Flat canal and laterals L and S, Big Flat unit, Missoula Valley project, Montana. Project is situated near Missoula, Mont. Work to be performed includes, as part of headworks for canal, the construction of a precast concrete pipe siphon under the tracks of the Northern Pacific Railroad. Pipe to be installed by the jacking method.

CONDITIONS: Contractor to furnish sand and coarse aggregate; form materials spikes and nails under twenty-penny in size; wire and wire ties for holding reinforcement bars; all temporary supports; water; embankment and backfill materials; rock and rock spalls; sealing compound for coating joints; and all other materials not part of completed structure, but required for completion of the work. Government to furnish balance of materials, including cement, reinforcement bars, precast concrete pipe, lumber for permanent installation, gates and gate hoists, and miscellaneous metalwork. Time for completion is 180 calendar days. Rail and highway transportation facilities available. Wage rates are: skilled labor, $1.00 to $1.50 per hour; semi-skilled, 95c. to $1.25; and common, 75c. to 90c.

BIDS: Seven bids were received May 15, 1945, ranging from the contract low of $129,952 to $192,241.

LIST OF BIDDERS: (Schedules 1 and 2 combined).

1. Otis Williams & Co., Helena, Mont. (contract) $129,952
2. Nilson, Smith Constr. Co., Great Falls, Mont. 130,330
3. Robertson & Cave, Great Falls, Mont. 136,697
4. Barnard Curtis Co., Minneapolis, Minn. 142,023
5. Peter Kiewit Sons' Co., Sheridan, Wyo. 180,978
6. Union Construction Co., Great Falls, Mont. 185,116
7. James Constr. Co., Seattle, Wash. 192,241

Schedule No. 1

Item	Quan.	Unit Prices (1)	(2)	(3)
1. Clearing between Sta. 98 and 148	3.5 ac.	$85.00	$175.00	$60.00
2. Clearing between Sta. 212 and 308	18.7 ac.	85.00	175.00	60.00
3. Grubbing between Sta. 98 and 148	3.5 ac.	85.00	175.00	23.65
4. Grubbing between Sta. 212 and 308	18.7 ac.	85.00	80.00	23.65
5. Excavation, common, for canal	100,700 c. y.	.30	.23	.2875
6. Excavation, rock, for canal	5,300 c. y.	1.50	.75	1.45
7. Overhaul	10,000 sta. c. y.	.05	.06	.0233
8. Compacting embankments	2,000 c. y.	.40	.40	.23
9. Excav., common, drng. channels and dikes	1,000 c. y.	.30	.50	.29
10. Excav., rock, drng. channels and dikes	100 c. y.	.30	1.50	1.45
11. Earth lining of canal	1,300 c. y.	.30	.50	.46
12. Excav., common, for structures	12,000 c. y.	.75	.75	.80
13. Excav., rock, for structures	1,000 c. y.	2.50	1.00	1.45
14. Backfill	5,500 c. y.	.25	.20	.29
15. Compacting backfill	2,300 c. y.	.50	.75	1.10
16. Concrete in structures	1,200 c. y.	30.00	35.00	37.00
17. Placing reinforcement bars	125,000 lb.	.04	.05	.0475
18. Dry-rock paving	200 s. y.	3.00	4.00	4.73
19. Erecting timber in structures	23 M bm.	40.00	70.00	56.79
20. Place elastic joint filler mat'l	9 s. f.	1.00	2.00	1.44
21. Place metal water stops in joints	320 lb.	.10	.20	.36
22. Lay 18-in. concrete pipe	121 l. f.	1.00	1.50	1.38
23. Lay 24-in. concrete pipe	256 l. f.	1.50	1.60	1.90
24. Lay 48-in. concrete pipe	98 l. f.	2.25	6.00	8.97
25. Jacking 48-in. conc. pipe under R.R.	42 l. f.	20.00	15.00	27.74
26. Install gates and gate hoists	2,600 lb.	.10	.20	.12
27. Install misc. metalwork	5,000 lb.	.10	.20	.18

Schedule No. 2

28. Excavation, common, for canal	30,000 c. y.	.30	.25	.23
29. Excavation, rock, for canal	100 c. y.	1.00	1.50	1.45
30. Overhaul	15,000 sta. c.y.	.05	.06	.0233
31. Compacting embankments	13,500 c. y.	.40	.40	.23
32. Excav., common, drng. channels and dikes	300 c. y.	.30	.50	.29
33. Excav., rock, drng. channels and dikes	10 c. y.	.30	2.00	1.45
34. Earth lining of canal	1,100 c. y.	.30	.40	.46
35. Excavation, common, for structures	650 c. y.	1.00	.75	.80
36. Excavation, rock, structures	10 c. y.	1.00	2.00	1.45
37. Backfill	1,000 c. y.	.25	.20	.29
38. Compacting backfill	600 c. y.	.50	.75	1.10
39. Concrete in structures	210 c. y.	35.00	35.00	38.70
40. Place reinforcement bars	17,000 lb.	.04	.05	.0473
41. Dry-rock paving	340 s. y.	3.00	4.00	4.73
42. Erecting timber in structures	1 M bm.	40.00	70.00	56.79
43. Lay 15-in. concrete pipe	70 l. f.	1.00	1.50	1.38
44. Lay 18-in. concrete pipe	153 l. f.	1.00	1.50	1.38
45. Lay 30-in. concrete pipe	54 l. f.	1.50	3.00	1.73
46. Lay 36-in. concrete pipe	56 l. f.	1.50	4.00	1.84
47. Lay 42-in. concrete pipe	32 l. f.	2.00	5.00	2.30
48. Installing gates	5,500 lb.	.10	.20	.12
49. Install miscellaneous metalwork	2,200 lb.	.10	.20	.18

HIGHWAY IMPROVEMENTS, WASHINGTON

OWNER: Washington Dept. of Highways, Olympia, Wash. Clarence Hickey, director.

PROJECT: Grading, drainage structures, clearing and grubbing 3.445 miles of Primary State Highway No. 1 from Martins Bluff to Chicken Coop Inn, Cowlitz County, Wash.

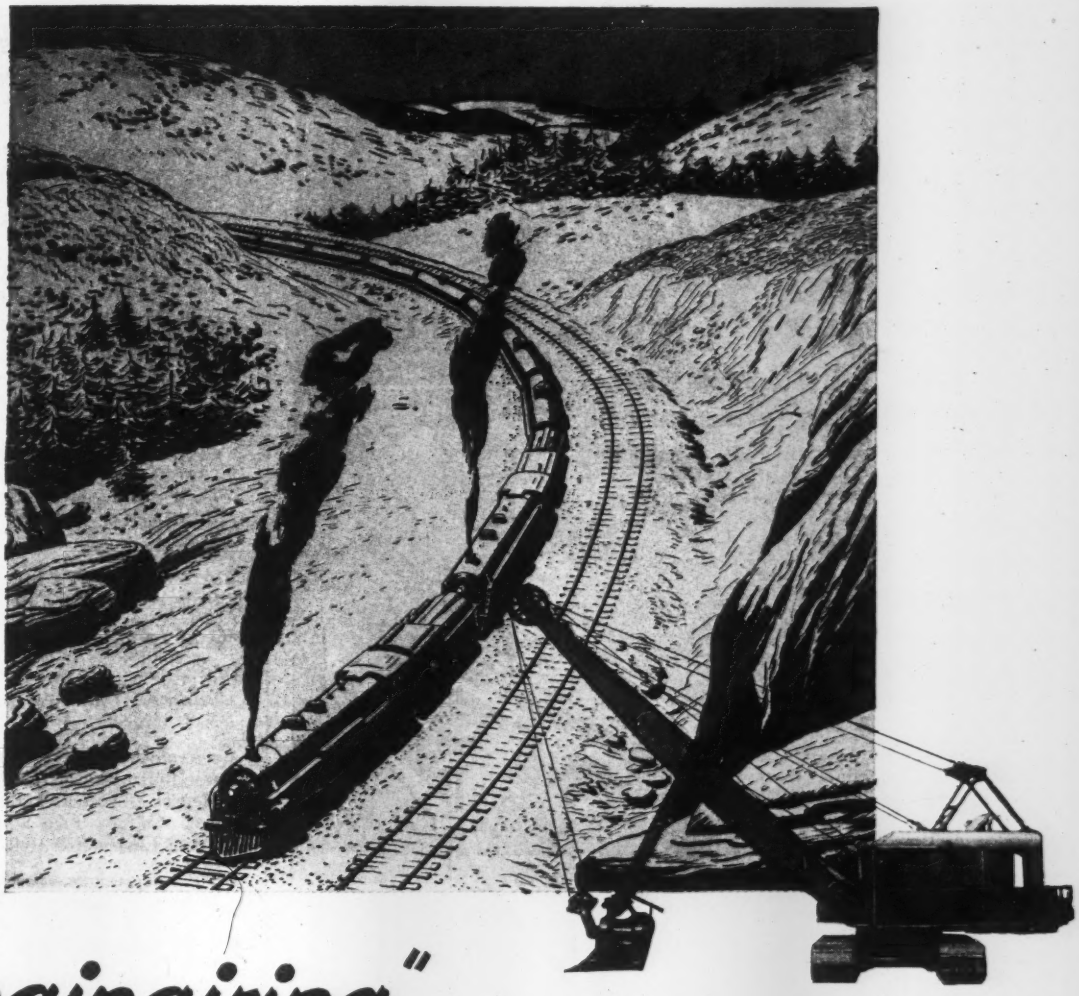
CONDITIONS: Contractor to furnish all materials except 12- and 18-in. concrete or vitrified clay culvert pipe (standard), and complete work in 210 calendar days. Rail and highway transportation facilities available. Wage rates are: skilled labor $1.50 to $1.75 per hour; semi-skilled, $1.15 to $1.60; and common, $1.00 to $1.25.

BIDS: Fourteen bids were received December 28, 1944, ranging from the contract low of $442,592 to $722,015.

LIST OF BIDDERS:

1. Erickson Paving Co., Seattle, Wash. (contract) .. $442,592
2. R. A. Heintz, Portland, Ore. 464,921
3. Goetz & Brennan, Seattle, Wash. 518,107
4. Strong & Macdonald, Inc., Tacoma, Wash. 519,006
5. Northwest Construction Co., Seattle, Wash. 526,015
6. N. Fiorito Co., Seattle, Wash. 531,545
7. Sound Constr. & Engr. Co., Seattle, Wash. 541,792
8. Kuckenberg Constr. Co., Portland, Ore. 567,301
9. L. Romano Engr. Co., Seattle, Wash. 630,273
10. E. C. Hall Co., Portland, Ore. 630,409

Item	Quan.	Unit Prices (1)	(2)	(3)
1. Clearing	58.1 ac.	$300.00	$400.00	$250.00
2. Grubbing	31.5 ac.	300.00	330.00	220.00
3. Common excav. (incl. 600-ft. haul)	225,150 c. y.	.48	.18	.31
4. Solid rock excav. (incl. 600-ft. haul)	270,520 c. y.	.48	.73	.92
5. Unclass. excav. (incl. 600-ft. haul)	14,590 c. y.	.48	.20	.92
6. Common trench excav. (incl. 600-ft. haul)	6,420 c. y.	1.20	1.00	1.60
7. Solid rock trench excav. (incl. 600-ft haul)	980 c. y.	3.00	1.00	1.82
8. Overhaul on above materials	230,360 sta. c. y.	.01	.02	.01
9. Overhaul on above materials	4,267.63 mi. c. y.	4.00	5.00	4.00
10. Slope treatment	17,467 l. f.	.20	.10	.10
11. Finishing roadway (sta., 100-ft.)	197.8 sta.	15.00	10.00	15.00
12. Structure excavation	3,540 c. y.	2.50	2.00	2.00
13. Excav. for sand drains (incl. haul)	6,500 l. f.	1.80	2.00	1.60
14. Gravel backfill, in place	395 c. y.	3.50	4.00	3.00
15. Backfill for sand drains	760 c. y.	3.00	2.50	3.00
16. Selected roadway borrow	22,390 c. y.	1.75	2.25	1.75
17. Selected sand borrow	7,610 c. y.	1.75	2.25	2.25
18. Cr. stone surf. top crse. on rdway	1,330 c. y.	3.00	4.00	2.25
19. Cr. stone surf. base crse. on rdway	2,220 c. y.	3.00	4.00	2.25
20. Sand filler, incl. haul	360 c. y.	2.00	2.25	2.00
21. Water	98 M gal.	2.50	3.00	4.00
22. Class A concrete	641 c. y.	40.00	42.50	38.00
23. Steel reinforcing bars	110,230 lb.	.08	.06	.055
24. Rein. conc. rt.-of-way markers	110 ea.	5.00	4.00	4.00
25. Rein. conc. F. A. markers	3 ea.	16.00	25.00	15.00
26. Remove existing concrete pavement	1,403 s. y.	.50	.50	.30
27. Remove existing guard rail	200 l. f.	.30	1.00	.10
28. Place conc. or vitr. clay pipe, 12-in.	780 l. f.	1.00	1.25	1.10
29. As above, 18-in.	51 l. f.	2.00	2.00	2.00
30. Std. rein. conc. culv. pipe, 12-in	751 l. f.	2.00	1.75	1.30
31. As above, 18-in.	882 l. f.	2.50	3.25	2.50
32. As above, 24-in.	351 l. f.	3.35	4.00	3.20
33. As above, 36-in.	452 l. f.	7.50	8.00	8.25
34. 36-in. ext. str. rein. conc. culv. pipe	240 l. f.	9.00	9.00	10.00



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helps to *cross* mountains and helps to *move* them!

When mile-long trains of war materials must cross a mountain, the powerful locomotives can do only part of the job. The locomotives can take trains up the grades but the brakes are relied on to get them down . . . and that's where "Enginairing" has played a vital part.

Uniform brake application and release throughout the train are required to assure smooth handling and thereby protect lading and equipment. Enginairing developed the necessary qualities. The braking impulse travels the length of the train in approximately the time that the sound of the whistle travels from engine to caboose. By a few inches of movement of a small handle, the engineer commands a hundred cars or more.

The same Enginairing that has helped the railroads work transportation miracles, is helping industry, too. On modern earth-moving equipment, for instance, the operator need no longer muscle heavy levers. Instead, with the touch of a finger, he moves the handles of small W-A-B controls . . . and governs an entire cycle of operations. The actuating mechanism can be designed to handle any force from ounces to tons. Interlocks can be provided, to safeguard equipment from damage through incorrect manipulation.

Enginairing can make a big contribution to modernizing products and improving production, in post-war times. When that day comes, remember that our 76 years of Enginairing experience will be ready and willing to serve you.

WESTINGHOUSE AIR BRAKE COMPANY

INDUSTRIAL DIVISION

General Offices:
WILMERDING, PA.

WABCO PACKING

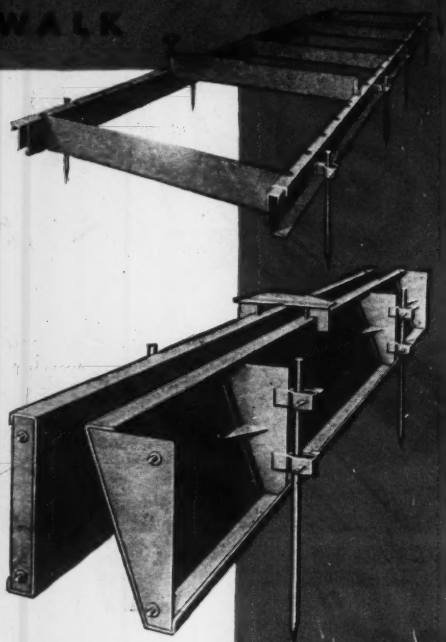
COMPRESSORS

REMOTE CONTROLS

HOW TO

improve appearance and save money

ON CONCRETE CURB, GUTTER AND SIDEWALK



You buy Heltzel Steel Forms once. They stay in service for 20 years or more and each job you set is as uniform as the ones before. The low cost of the equipment per year of service plus the benefits of faster work with the use of forms net substantial savings.

Rigid, self-interlocking Heltzel Steel Forms make the setting and stripping job much easier and faster. No warping, no chipping, no replacements.

Heltzel has been engineering steel forms for 36 years. No matter how complicated or individual your specifications, we can furnish forms for your work.

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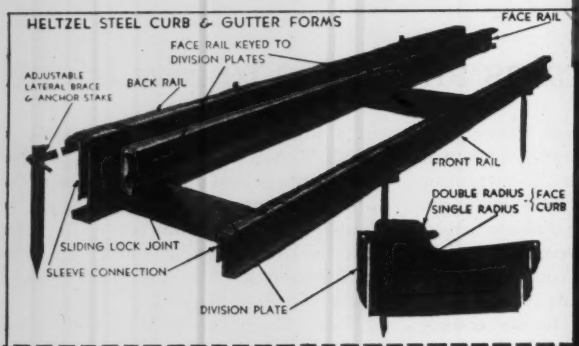

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New Engineering Books

(*Continued from page* 112)

ORGANIZED LABOR: Vol. III of The Economics of Labor—By Harry A. Millis and Royal E. Montgomery. 930 pp. McGraw-Hill Book Co., New York 18. $6.

AMERICAN PLANNING AND CIVIC ANNUAL—Edited by Harlean James. 178 pp. American Planning and Civic Assn., 901 Union Trust Bldg., Washington, D. C. $3.

CITY DEVELOPMENT—By Lewis Mumford. 248 pp. Harcourt, Brace and Co., New York. $2.

INDUSTRIAL ORGANIZATION AND MANAGEMENT—By Lawrence L. Bethel, Franklin S. Atwater, George H. E. Smith and Harvey A. Stackman, Jr. 798 pp. McGraw-Hill Book Co., New York 18 and London. $4.50.

SIMPLIFIED DESIGN OF STRUCTURAL STEEL—By Harry Parker. 226 pp. John Wiley & Sons, New York; Chapman & Hall, London. $2.75.

HOW TO SOLVE IT—By G. Polya. 204 pp. Princeton University Press, Princeton, N. J. $2.50.

MECHANICAL AND ELECTRICAL EQUIPMENT FOR BUILDINGS, 2n Edition—by Charles Merrick Gay and Charles De Van Fawcett. 453 pp. John Wiley & Sons, New York; Chapman & Hall, London. $5.

BRICK ENGINEERING. Second Printing—By Harry C. Plummer and Lesile J. Reardon. 437 pp. Structural Clay Products Institute, Washington, D. C. $4.50.

THE MEANING OF RELATIVITY—By Albert Einstein. 135 pp. Princeton University Press, Princeton, N. J. $2.

MAKING PATENT DRAWINGS—By Harry Radzinsky. 96 pp. The Macmillan Co. New York. $3.

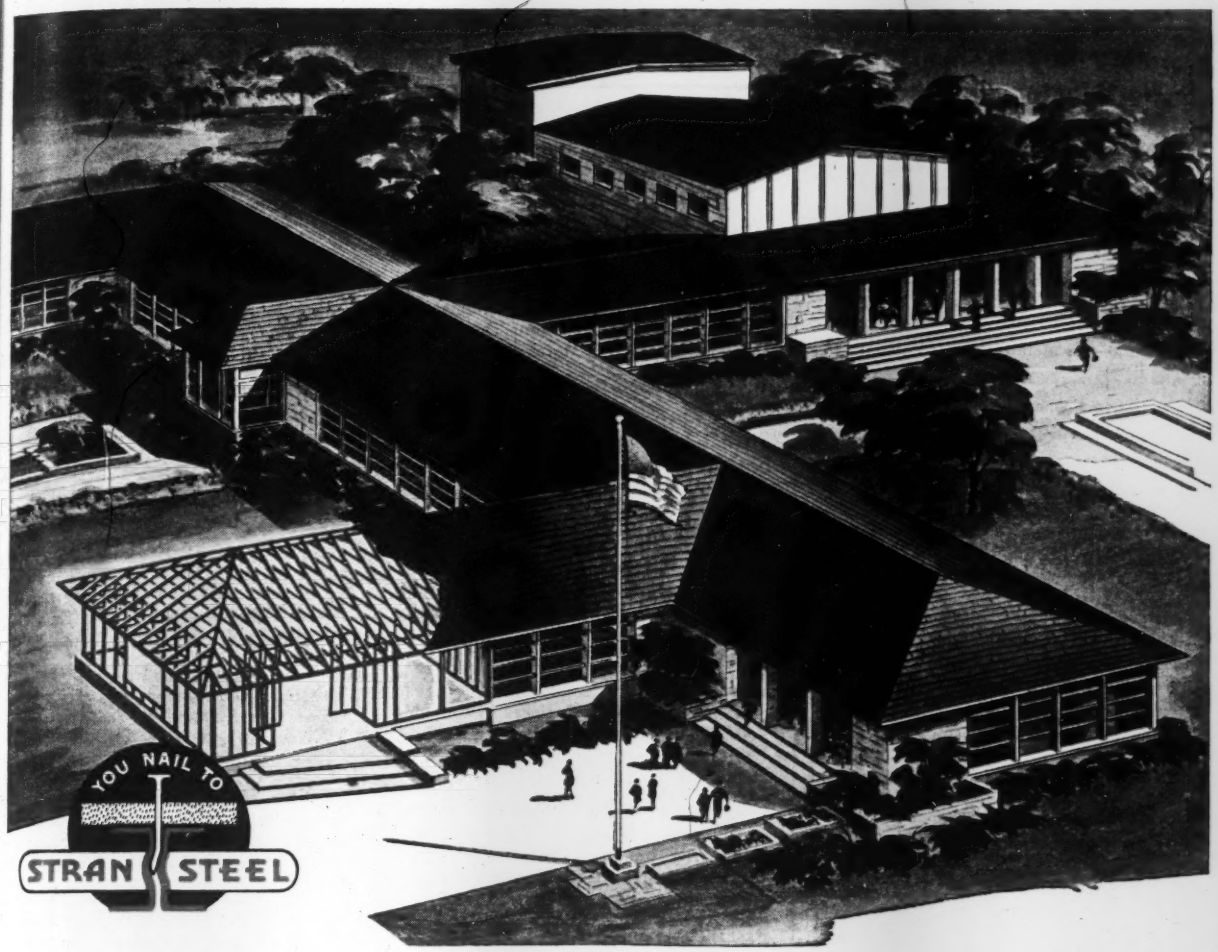
MANUAL OF TRAFFIC ENGINEERING STUDIES—118 pp. National Conservation Bureau, 60 John St., New York 7, N. Y. $2.

THE MOSQUITOES OF NEW JERSEY AND THEIR CONTROL—By Thomas J. Headlee. 326 pp. Rutgers University Press, New Brunswick, N. J. $4.

PROBLEMS IN ENGINEERING DRAWING, Series 1—By A. S. Levens and A. E. Edstrom. McGraw-Hill Book Co., New York and London. $2.50.

GROUND-WATER RESOURCES OF THE CRETACEOUS AREA OF ALABAMA—By Charles W. Carlston. 203 pp. Prepared by the U. S. Geological Survey in cooperation with the Geological Survey of Alabama, University, Ala.

ADMINISTRATIVE BUILDING COUNCIL OF INDIANA: Vol. I, Building Rules and Regulations; Vol. II, Electrical Rules and Regulations; Vol. III, Plumbing Rules and Regulations; Vol. IV, Heating, Ventilating and Air Conditioning Regulations. Distributed by Purdue University, Lafayette, Ind.



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Reports and Pamphlets

SUFFOLK COUNTY MOSQUITO EXTERMINATION COMMISSION—Annual Report for year ending Oct. 31, 1944. Yaphank, N. Y.

SASKATCHEWAN, CANADA—Annual Report of the Department of Highways and Transportation, 1943-44.

HARTFORD, CONN.—Thirty-fifth Annual Report of the Department of Engineering for the year ending March 31, 1944.

CHICAGO, ILL.—Sixty-eighth Annual Report of the Department of Public Works for the year ending Dec. 31, 1943.

INTERSTATE SANITATION COMMISSION, New York, New Jersey, Connecticut—Annual Report of 1944. 66 Hudson St., New York 13, N. Y.

A RESIDENTIAL SEWAGE TREATMENT PLANT—By A. C. Peterson. Bulletin 118, Engineering Extension Service, Iowa State College, Ames, Iowa.

THE VALLEY HIGHWAY—By Crocker and Ryan, Consulting Engineers. A report to the State Highway Engineer of Colorado on a north-south limited-access highway through Denver. Crocker and Ryan, First National Bank Bldg., Denver, Colo.

COMPILATION OF RENTAL RATES FOR CONSTRUCTION EQUIPMENT, Third Edition—Prepared by Rental Committee, Associated Equipment Distributors, National Press Bldg., Washington, D. C. $2.

RESEARCH POINTS THE WAY—American Iron and Steel Institute, 350 Fifth Ave., New York 1, N. Y.

A YEARBOOK OF RAILROAD INFORMATION, 1944 EDITION—Eastern Railroad Presidents Conference Committee on Public Relations, 143 Liberty St., New York, N. Y.

DALLAS, TEXAS—A Master Plan for Water and Sanitary Sewer Utilities, Feb., 1945.

THE STATUS OF PUBLIC WORKS PLANNING AND ITS RELATION TO FULL EMPLOYMENT—Bulletin No. 20, American Public Works Assn., Chicago, Ill. $1.

PLANNING FOR SCHENECTADY—Progress Report of the Interdepartment Postwar Planning Committee. Schenectady, N. Y.

WATER LEVELS AND ARTESIAN PRESSURE IN OBSERVATION WELLS IN THE UNITED STATES IN 1942—Part 5, Northwestern States. Geological Survey Water-Supply Paper 948. For sale by the Superintendent of Documents, U. S. Government Printing Office, Washington 25, D. C.

A POST-WAR LOW-RENT PUBLIC HOUSING PROGRAM—A Report by National Committee on Social Legislation, National Lawyers Guild, 36 West 44th St., New York 18, N. Y.

GROUND WATER IN THE REPUBLICAN RIVER BASIN IN NEBRASKA, Part II, Furnas County—Nebraska Water Resources Survey Water Supply Paper 1. The University of Nebraska, Lincoln, Neb.

UNDERGROUND LEAKAGE FROM ARTESIAN WELLS IN THE FLOWELL AREA, NEAR FILLMORE, UTAH—Technical Publication No. 1, State Engineer's Office, Salt Lake City, Utah.

THE OGDEN VALLEY ARTESIAN RESERVOIR, Weber County, Utah—Technical Publication No. 2, State Engineer's Office, Salt Lake City, Utah.

MISSOURI SKYWAYS—Missouri State Department of Resources and Development, Jefferson City, Mo.

FORT WORTH PLANS FOR THE FUTURE—Prepared by Fort Worth Chamber of Commerce, Forth Worth, Texas.

HIGHWAYS IN THE UNITED STATES—1945—Public Roads Administration, Federal Works Agency, Washington, D. C.

CONTRACT TERMINATION—Based upon the new Joint Army-Navy Termination Regulation and Standard Contract Settlement Proposal Forms. R. G. Le Tourneau, Inc., Peoria, Ill.

THE WORLD SYSTEM OF DECIMAL WEIGHTS MEASURES GRADUATION AND TIME—Universal Unit Systems, Inc., 60 East 42nd St., New York, N. Y. $1.25.

REPORT TO THE LEGISLATURE OF THE STATE OF NEW YORK by the Joint Legislative Committee studying the problem of checking erosion along the Atlantic Shoreline of the State, Feb. 15, 1945. Albany, N. Y.

APPROVED STATE AND MUNICIPAL PROJECTS—Jan. 1, 1945. New York State Postwar Public Works Planning Commission, Albany, N. Y.

STRESS RELIEF OF WELDMENTS FOR MACHINING STABILITY—By J. R. Stitt. Engineering Experiment Station Bulletin No. 121, Ohio State University, Columbus, Ohio. 50c.

POSTWAR PLANNING FOR METROPOLITAN UTILITIES—By John Bauer. 30 pp. National Municipal League, 299 Broadway, New York 7, N. Y. Single copy 35c.

THE DRAINAGE OF AIRPORTS—By W. W. Horner. Engineering Experiment Station Circular Series No. 49. University of Illinois, Urbana. 50c.

IMPACT ON RAILWAY BRIDGES—By Charles T. G. Looney. Engineering Experiment Station Bulletin Series No. 352. University of Illinois, Urbana. $1.

THE ALABAMA STATE DOCKS, A Case Study in State Development—By Earle L. Rauber. 56 pp. Federal Reserve Bank of Atlanta, Ga.

STRENGTH PROPERTIES OF YELLOW POPLAR FROM VIRGINIA—By E. George Stern, Engineering Experiment Station Series No. 59. Virginia Polytechnic Institute, Blacksburg, Va.

AN AIRPORT SYSTEM—Wisconsin State Planning Board Bulletin No. 15. Madison, Wis.

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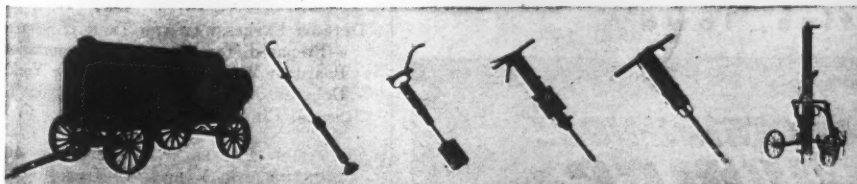

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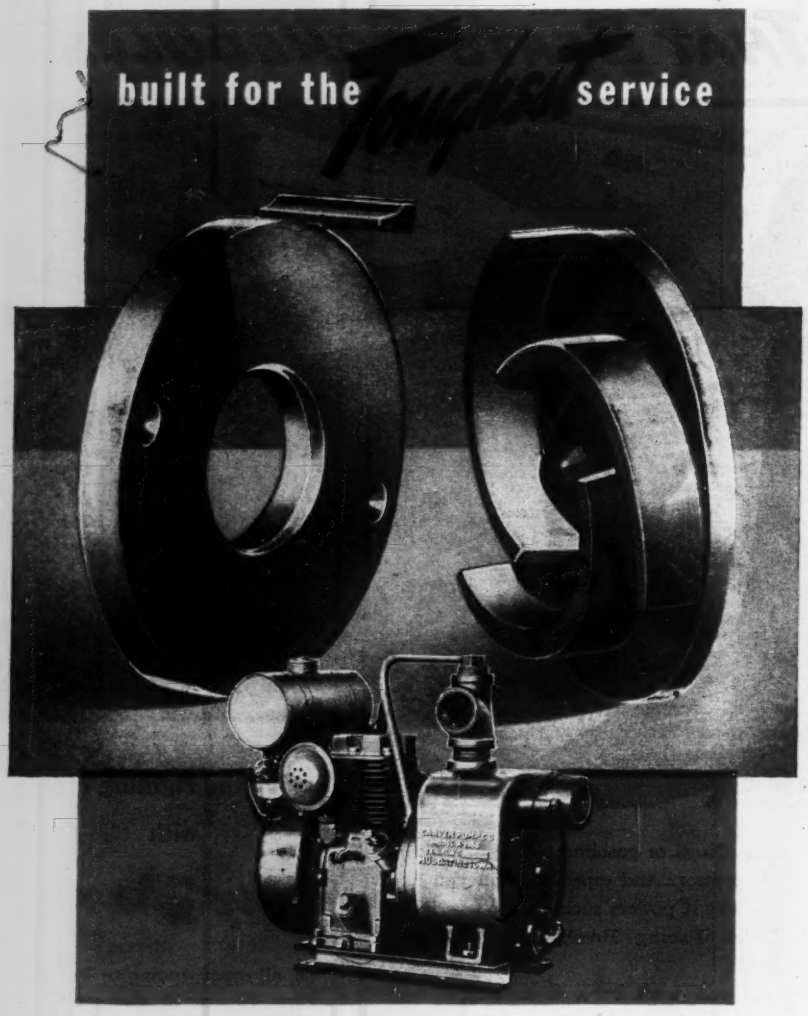

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INATION AND TERMINAL IMPROVEMENT FOR NEW ORLEANS, LA.—Report by Godat and Heft, Consulting Engineers, consisting of two volumes. Prepared for the City of New Orleans under the direction of the Department of Public Utilities.

CONCRETE SUPPORTED RAILWAY TRACK—Portland Cement Assn., 33 West Grand Ave., Chicago, Ill. Limited distribution.

THE SOCIAL EFFECTS OF PUBLIC HOUSING—Housing Authority of the City of Newark, N. J.

PICTURE PROGRESS STORY SANTEE COOPER—South Carolina Public Service Authority, Columbia (C), South Carolina. $5.

CHEMICAL ANALYSES OF SURFACE WATERS OF PENNSYLVANIA DURING LOW FLOW, JULY-OCTOBER, 1944. U. S. Dept. of the Interior, Geological Survey, Washington, D. C.

WHAT ABOUT OUR FUTURE?—A preview of planning for Toledo and Lucas County adopted by the Toledo and Lucas County Plan Commissions, Toledo, Ohio.

THE GREAT BAY PLAN—A report to the 1945 Legislature by the New Hampshire State Planning and Development Commission, Concord, N. H.

REPORT OF THE LEGISLATIVE COMMISSION ON RAPID TRANSIT, 1945—Commonwealth of Massachusetts, State House, Boston.

TEN YEARS OF STATE PLANNING—Maryland State Planning Commission, Baltimore, Md.

FORT PITT BRIDGE WORKS—50 Years of Progress in Steel Construction. Pittsburgh, Pa.

EVAPORATION INVESTIGATIONS IN SOUTHERN CALIFORNIA—By Arthur A. Young. A report of evaporation investigations by the Division of Irrigation, Soil Conservation Service, in cooperation with the Division of Water Resources, Department of Public Works, State of California.

AIRPORT PLAN—Prepared for the Milwaukee County Board of Supervisors, Milwaukee, Wis.

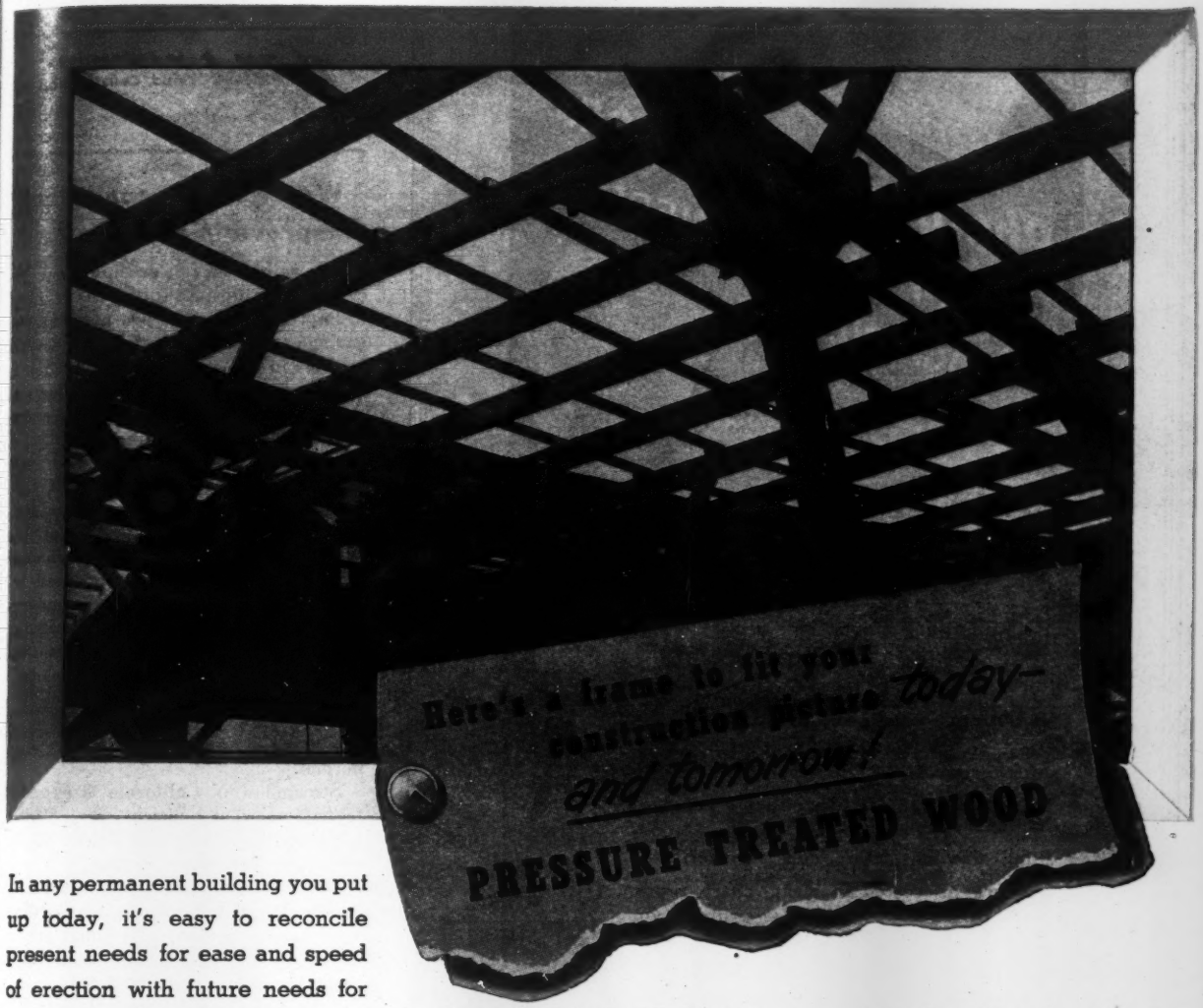
THE FOREST INDUSTRIES BLAZE NEW TRAILS—Timber Engineering Co., 1319 18th St., N.W., Washington 6, D. C.

IMPROVEMENT IN TRAFFIC FACILITIES RECOMMENDED FOR MIAMI, FLORIDA—Automotive Safety Foundation, Washington 5, D. C.

ANNUAL REPORT OF THE DEPARTMENT OF PUBLIC WORKS—City and County of Honolulu, Hawaii. Year ending Dec. 31, 1944.

DETROIT EXPRESSWAY AND TRANSIT SYSTEM—Prepared for Detroit Transportation Board by W. Earle Andrews, New York; DeLeuw, Cather & Co., Chicago; L. Segoe, Cincinnati.

INDUSTRIAL-PROPERTY RECORDS FOR ACCOUNTING AND VALUATION USES—By C. V. Armstrong. Iowa Engineering Experiment Station Bulletin 160. The Iowa State College Bulletin, Ames, Iowa.



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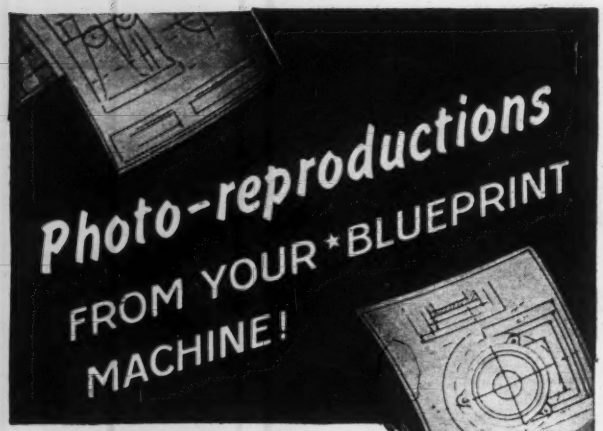

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(*Continued from page 76*)

Water supply conditions improve in the West

Generally heavy precipitation recently in the western states, has resulted in improvement in the prospects for the summer's water supply on several streams in those states. The outlook is now fairly satisfactory for irrigation and power development, although no excessive runoff is in sight.

The forecasts are based on a new technique developed by the U. S. Weather Bureau. Precipitation and temperature data from stations of the Weather Bureau and the Canadian Meteorological Service were used instead of data obtained by snow surveys.

The upper Platte River is expected to yield from 119 to 133 percent of normal while the prospects in the Colorado Basin are for near normal runoff. The inflow to Lake Mead is predicted to be 9,374,000 acre-ft., or 106 percent of normal.

Streamflow in California is expected to be somewhat deficient, as indicated by a predicted inflow in Shasta Reservoir of 80 percent of normal.

The most deficient runoff is expected in the Pacific Northwest where flows less than 50 percent of normal are indicated in the Pend Oreille basin. Sixty-eight percent normal runoff is predicted for the Columbia River at The Dallas, with a peak discharge of 350,000 cfs. expected about June 12.

. . .

New span at New Orleans is being considered

No opposition was voiced at the original hearing being conducted in New Orleans, La., by Col. George H. Hudson, U. S. District Engineer, on the application of the Louisiana Department of Highways for a permit for the construction of a high level vehicular bridge spanning the Mississippi River at Julia Street. However, some opposition has since developed. The original application specified a maximum vertical clearance of 175 ft. over high water and 195 ft. above mean low water. This application was revised to 150 ft. vertical clearance above high water.

The proposed structure is a postwar project. It would be 3,000 ft. long, of conventional cantilever type, with a center span of 1,800 ft. and two end spans of 600 ft. each from pier centers.

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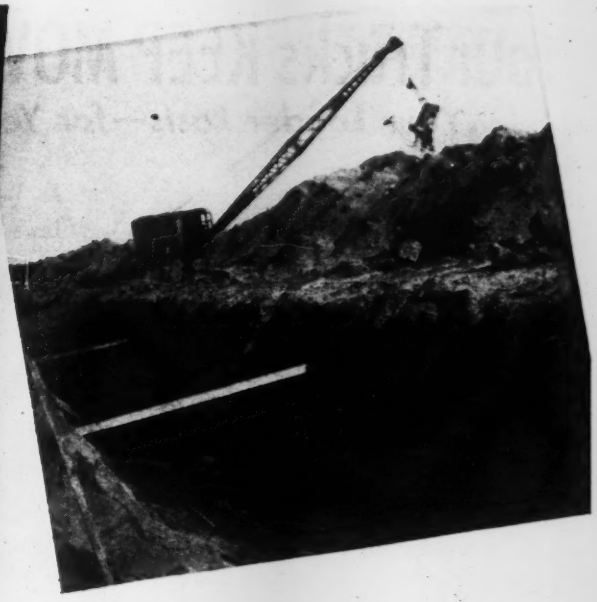

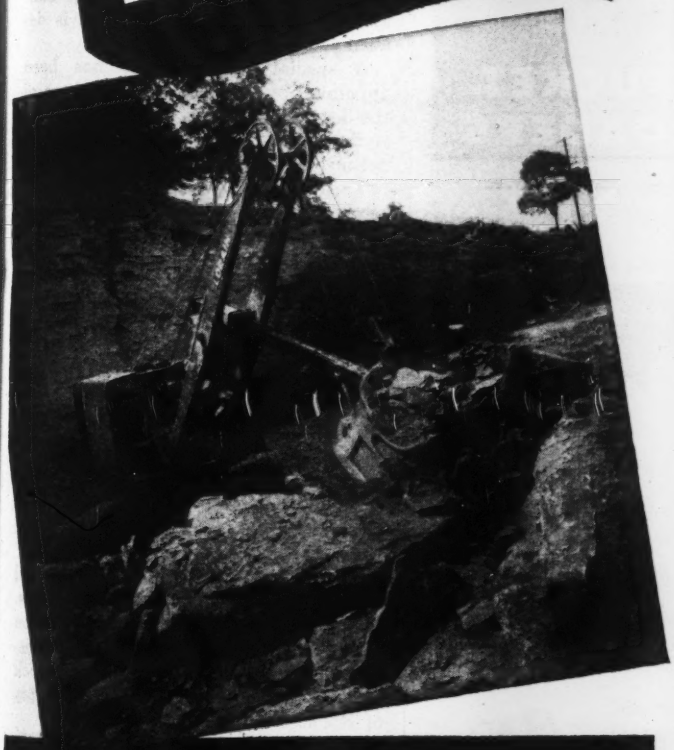

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11. Mechanism runs in oil bath.
12. Generous underneath clearances.
13. Centralized lubrication.
14. Wider treads.
15. All-welded shovel boom (strength; all-steel; torsion-resisting).
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17. Dipper door stops to protect stick.
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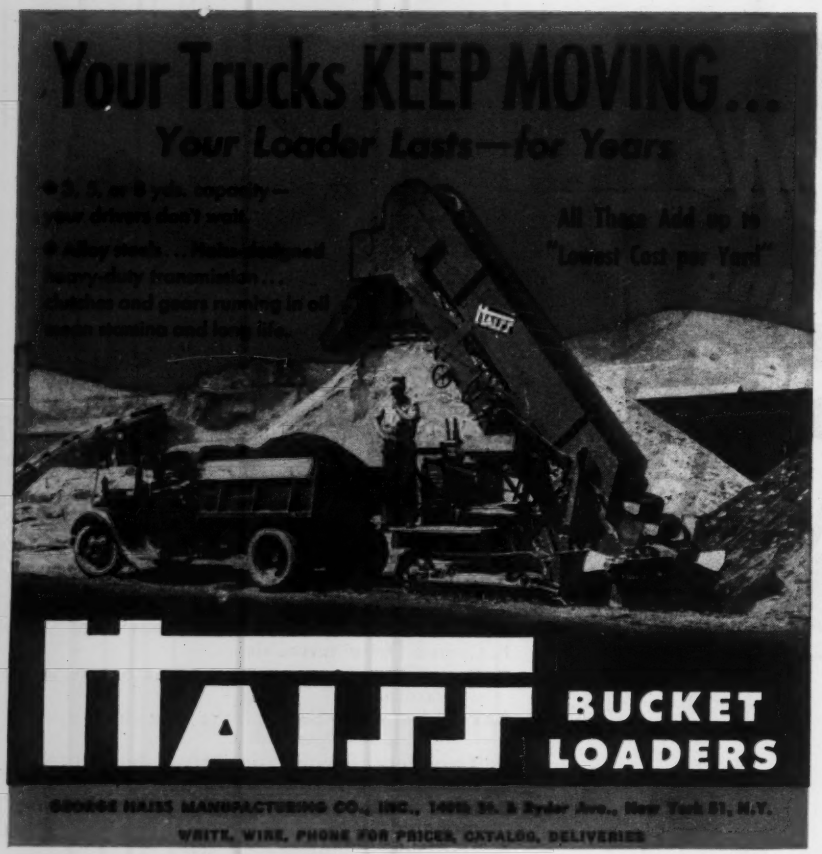
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Detailed plans will be prepared upon determination as to the vertical clearance required by the War Department permit. Very deep pier foundation will be required, and construction methods are expected to be similar to those employed on the bridge of the New Orleans Public Belt Railroad, located about five miles above the city, where the piers were sunk through sand islands to 170 foot below mean Gulf level.

The bridge approaches would have a 3 percent grade. On the main city side (east bank) two ramps would be built originally, one starting from the foot of Canal Street where the ferry operates now, and the other originating at a point determined by a traffic survey. A third ramp would be added later, as needed.

Initially, only two 24-ft. roadways separated by a 6-ft. wide space will be built between the trusses, but the structure will be designed for the addition of two 224-ft. cantilevered roadways when traffic demands it. Cost estimates cannot be made until bridge height is determined.

A special sub-committee has been appointed by the highway committee of the local Association of Commerce to study possibilities of constructing a tunnel instead of a bridge.

This action was taken following receipt of a letter from T. Ed Ernst, engineer, in which construction of the tunnel was urged instead of the proposed Julia St. bridge.

Should the sub-committee report favorably on the tunnel project it would go before the association for approval. The association would then make a recommendation to the state highway department.

• • •

Seismological surveys for dam foundation

Two Jesuit priests, the Rev. Daniel Linehan, seismologist, and the Rev. Thomas J. Smith, in charge of Weston College Observatory, are making a seismic survey in the vicinity of Hemlock Lake, main source of the water supply of Rochester, N. Y.

The survey is being made at the request of the Rochester engineering department, which may wish to enlarge the capacity of the Hemlock watershed through erecting a dam there and wants to know whether or not there is a solid rock foundation on which to build. Since the Jesuits have developed a technique of seismic prospecting or surveying, government authorities at Washington referred the city engineer's office to Weston College.

The priest-scientists are using a truck which contains a mobile seismological laboratory—said to be the only one of its kind in the country. They will do

some dynamiting in the vicinity and make a study of earth vibrations through the use of delicate recording apparatus. The resulting records will enable them to determine the nature of the earth and rock structure which lies underneath.

• • •

New Tacoma power house injured by rock slide

Though damage to the mile-long tunnel and La Grande power house of the Second Nisqually Project at Tacoma, Wash., caused by a recent rock slide, latest in a long series of mishaps, has delayed completion of the $23,000,000 project, the West Construction Co. was relieved of further construction responsibilities early in May. The Tacoma Board of Contracts and Awards voted to accept the finished job following a report from Utilities Commissioner C. A. Erdahl that the company had completed all contract requirements. The $7,608,186 contract of the L. E. Dixon Co., Los Angeles, for construction of the Alder and La Grande dams in connection with the project was terminated March 9.

Clearing of the slide and repair work to the tunnel is being carried out by city crews and it is now expected the 40,000-kw. La Grande unit will be on the line about July 1. The crack, caused by a shifting of the overburden, necessitated the installation of 90 feet of additional lining in the 14½-ft. tunnel.

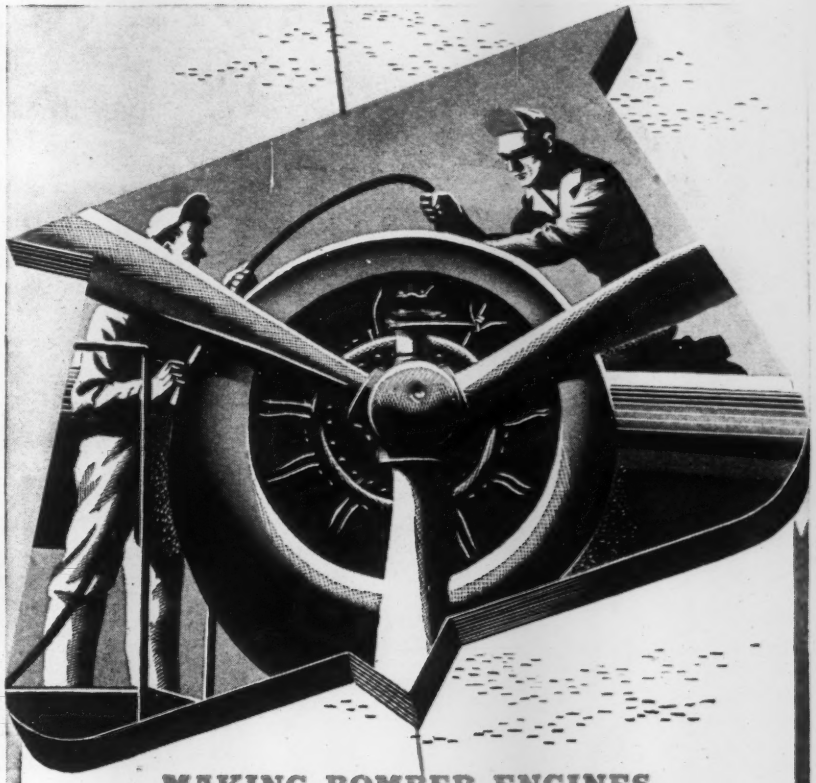
The 50,000-kw. Alder powerhouse is progressing according to schedule and the first of its two 25,000-kw. units should be on the line about Oct. 1. The War Production Board has just released the second 25,000-kw. unit and the installation is expected to be complete in April, 1946.

• • •

Name Engineer dredges after civilian employees

Dredges for the United States Army Corps of Engineers are to receive the names of civilians with outstanding records in the corps, Colonel George R. Goethals, chief of the Civil Works Division has announced.

Shattering a precedent that dredges be named for distinguished commissioned officers, one new floating plant will be named the Comber, for William George Comber, resident engineer in charge of all dredging in the Panama Canal, another the Gerig, for William Gerig, retired flood authority who served the government for more than fifty years.



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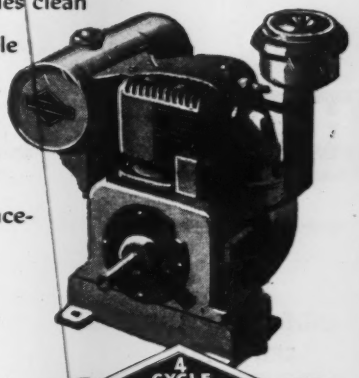

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Elections and Activities

Harold M. Lewis, consulting engineer, New York, was elected president of the Metropolitan Section, American Society of Civil Engineers, at the section's annual meeting, May 16. Harold E. Wessman was elected a vice president, and new directors are Eugene L. MacDonald, Louis E. Robbe and Homer R. Seely. The section voted to set up a committee on employment conditions with authority to undertake to settle disputes between employers and employees but without authority to set up collective - bargaining units under the A.S.C.E. plan. Beardsley Ruml, chairman of the Federal Reserve Bank of New York, spoke on the place of public works and construction in the national economy.

The New York State Society of Professional Engineers, at its annual meeting, elected Joseph A. Brady, division of highways, New York State Department of Public Works, White Plains, president. Vice presidents elected were Charles W. Burke and William H. Larkin, and directors elected were Robert A. Sovik, Lacy Ketchum and Walter J. O'Brien.

Edwin Elliot is again president of the Engineers Club of Philadelphia, Pa., having been reelected at the recent 68th annual meeting. Robert V. Hudson was elected vice-president; Herbert B. Allen, treasurer; and Charles D. Fawcett and J. P. Harbeson, Jr., directors.

P. E. Poitras was elected president of the Corporation of Professional Engineers of Quebec at the recent annual meeting. Other officers are: vice-president, A. D. Ross; secretary-treasurer, E. A. Ryan; councillors, A. Laframboise, E. Lavigne, George Midgley, Walter C. Hunt and E. Larochelle.

J. Andre Fouilhoux has been reelected president of the New York Building Congress, Inc. Other officers are: Vice-presidents, Robert H. Armstrong, Louis Skidmore, Bernard B. Smith, J. Archer Turner, and Howard McSpedon; secretary, J. W. Taussig; treasurer, C. George Dandrow; and chairman of the finance committee, Carlton S. Proctor.

P. E. Poitras of Montreal has been elected president of the Corporation of Professional Engineers of the Province of Quebec.

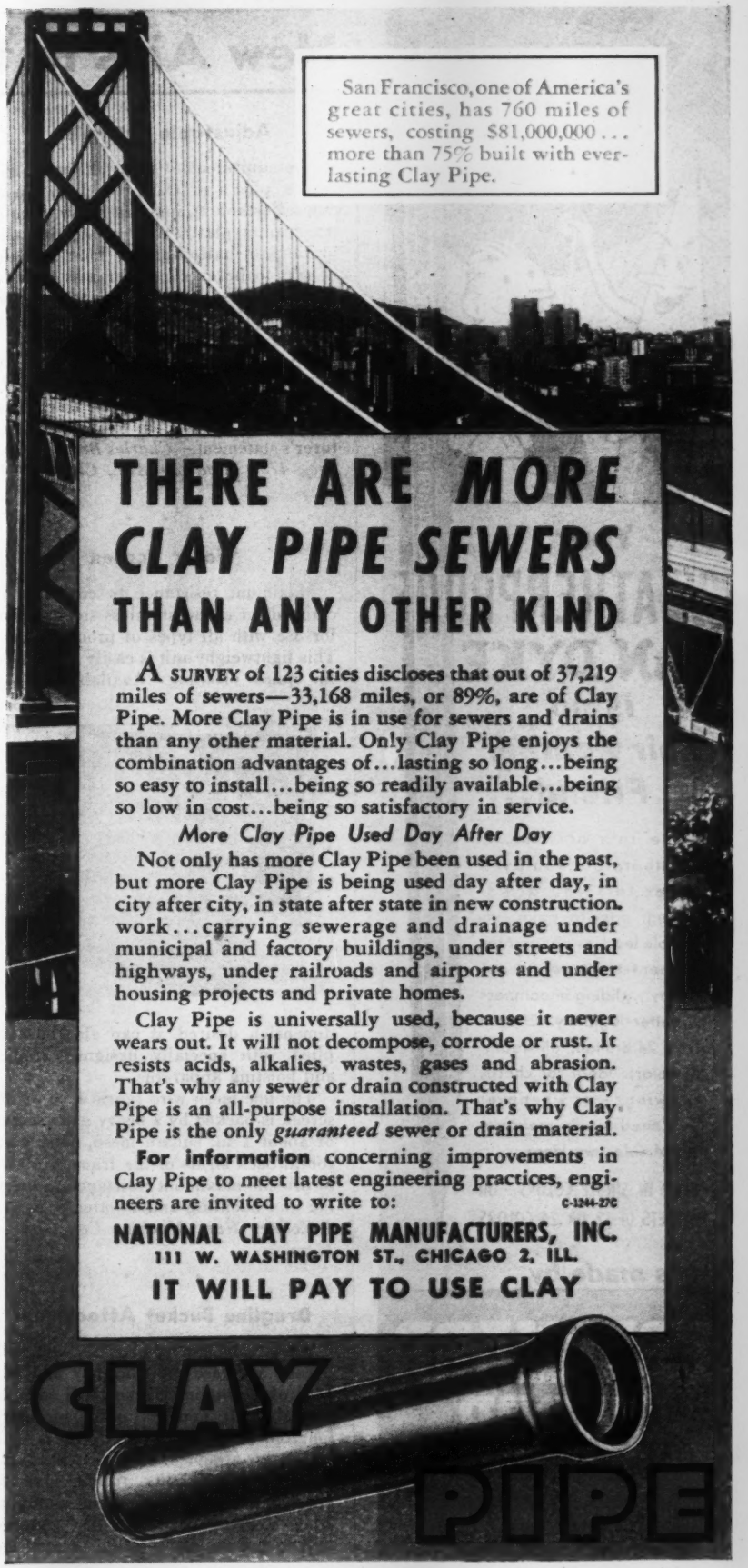
K. C. Lauster, director, Division of Sanitary Engineering, State Department of Health, has been elected president of the North Dakota Society of Professional Engineers, succeeding P. M. Barnes. John B. Jardine is the new vice president and George Teskey, secretary-treasurer.

Harry N. Hansen, Toledo, has been re-elected president of the Ohio Building Materials Dealers' Association. R. P. Mumford, Springfield, was named vice president; William F. Kern, jr., Columbus, treasurer; and Claude L. Clark, Columbus, secretary. The association went on record as protesting unfair OPA regulations affecting building materials and the OPA regulation on profits rather than prices.

W. M. Cobleigh, dean emeritus of Montana State College school of engineering, Bozeman, has been elected chairman of the Montana Sewage Works Association. Other officers are Kenneth Chrysler, Billings, vice-chairman; H. B. Foote, director of the division of sanitary engineering, Montana State Board of Health, Helena, secretary-treasurer; W. R. Border, Bozeman, and K. J. Winebrenner, Kalispell, trustees; and Joseph M. Schmit, Lewistown, national director.

New officers of the Montana Section, American Water Works Association, are: Fred Quinnell, Bozeman city manager, chairman; Gordon Beiswanger, Billings, vice-chairman; H. B. Foote, director of the division of sanitary engineering, Montana State Board of Health, Helena, secretary-treasurer; John Hazen, Butte, and Stuart Voden, Great Falls, trustees; and J. R. Cortese, Livingston, national director.

The American Society of Civil Engineers has joined other technical societies of the Houston, Tex., area to form the Engineers Council. The purpose is to serve the public welfare in all situations where there is a need for engineering and technical knowledge and to encourage the cooperation of Houston's technical societies, and to coordinate their civic interests. Member societies of the Engineers Council include the American Society of Civil Engineers, represented by Charles R. Haile, of Haile and McClendon, and Roscoe Owen of the Missouri Pacific Lines; Texas Society of Professional Engineers; American Institute of Architects; American Society of Heating and Ventilating Engineers; American Institute of Chemical Engineers; American Society of Mechanical Engineers; American Institute of Mining and Metallurgical Engineers; and the Houston Engineers Club.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New Aids to the Constructor

Adjustable Triangle

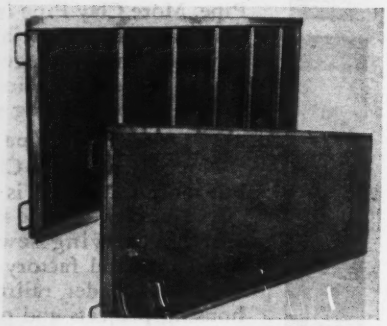
The equivalent of many different triangles, plus a protractor, is found in a new adjustable triangle, of heavy, highly transparent plastic with molded-in calibrations of half degrees. This triangle is said to be excellent for many kinds of layout work—for drawing screw threads, helical springs, bevel gears, accurate angles from 0 to 90 deg.

This precision-made instrument, 6¾ x 7⅞ in., has a positive locking device, easy to set for any angle. The triangle is non-warping, according to the manufacturer's statement.—*Charles Bruning Co., Inc., 4754 Montrose Ave., Chicago 41, Ill.*

• • •

Water Screen

Maximum resistance to corrosion is claimed for a new stainless steel screen, for use with all types of process water. This lightweight unit is easily removable for quick cleaning. Available in any



dimension desired, it can also be supplied with specially designed frames and hoisting apparatus.

The fine mesh wire fabric face of the screen is backed by a heavy gage screen of about 1 in. square mesh. The horizontal back struts of the frame are said to provide maximum resistance to bellying and buckling under water pressure. —*Rodney Hunt Machine Co., Orange, Mass.*

• • •

Dragline Bucket Attachment

An attachment which, it is said, will greatly increase the efficiency and pay load of a dragline bucket, will soon be available. It consists of a series of longitudinal bars formed into a unit which is attached to the top of the bucket with four bolts. It is designed to provide for fast loading and dumping when working in wet or dry material and to prevent the spilling of material over the back of the bucket, especially when working in ditches or on steep slopes.

This device can be applied to any standard bucket; it weighs approximately 150 lb. in the ¾ and 1-yd. sizes. —*Wellman Engineering Co., Cleveland, Ohio.*

• • •

Small Cargo Conveyor

Narrower and lighter than former machines, the new Junior cargo conveyor is available in belt widths of 16, 20 and 24 in., 20 to 40 ft. long. It

handles concrete and terra-cotta blocks, bricks, etc.

The rollers that support the belt are of ball-bearing type, closely spaced. This electric-driven conveyor is as light as can be built without sacrificing strength.—*George Haiss Mfg. Co., Inc., 391 Canal Place, Bronx, New York 51, N. Y.*

• • •

Moisture Detector

Taking advantage of the latest ideas in electrical circuits and electronic principles, the new Model R moisture detector covers a range of 7 to 25 percent moisture, with an accuracy of plus or minus 1 percent.

This complete, self-contained detector, for use with lumber and wood products and various construction materials, forces the electrode needles into the material; the reading is taken by turning the dial knob until a small light flashes, at the correct moisture content.—*Developed by W. J. Delmhorst, Colloid Equipment Co., Inc., 50 Church St., New York, N. Y.*

• • •

Level Lift Sling

New sizes—¾ and 1½-ton—have been added to the line of Macwhyte Caldwell "Level-Lift" slings, which are said to be safe and simple to operate. After the light-weight block containing wire rope is put on the crane hook, the operator spots the hook over the load's

Why you should restore war-weary highways with Asphalt-resurfacing

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2. It utilizes easily available materials
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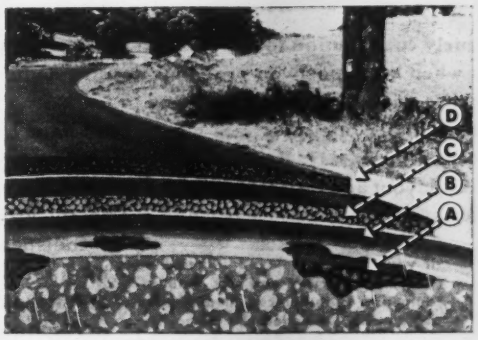
A Standard Asphalt Representative will be glad to give you details of methods and procedures followed by other highway departments in this work. Call the local Standard Oil Company (Indiana), or write 910 South Michigan Avenue, Chicago 80, Illinois.

One method of Asphalt-resurfacing

The cross-section on the illustration shows steps usually taken in asphalt-resurfacing.

A. *Spot Patching.* Where the old highway surface is badly broken, holes are patched by filling with the same mix as used in the binder course.

B. *Prime Coat.* A thin coat of cut-back asphalt, spread over the old road surface. When used, it helps to bind the asphalt to the old surface.



C. *Binder Course.* An asphalt-aggregate mix. It is delivered hot from the central mixing plant to an asphalt finishing machine.

D. *Wearing Course.* This is the top course, composed of asphaltic concrete with somewhat finer aggregate than is used in the binder course. It is also hot mixed at the central mixing plant and laid by machine. This top course presents a smooth, water-proof, long-wearing surface which requires no seal coat or stone application.

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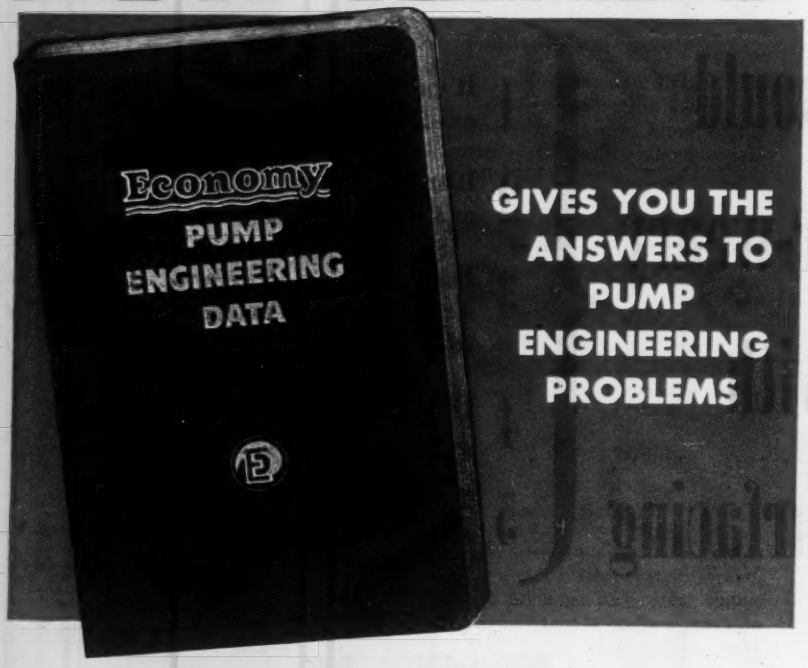

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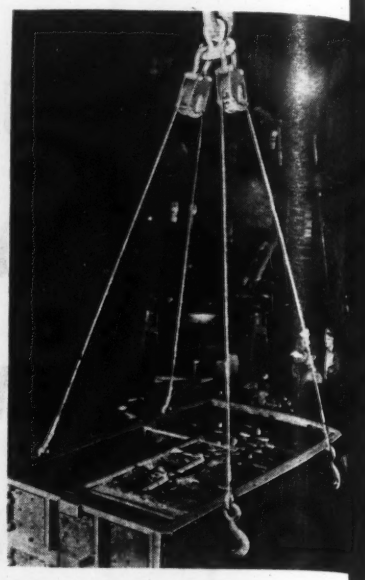
approximate center of gravity. When the hook lifts the load, the rope automatically adjusts itself through the



block. A sheave in the block pulls down against a brake to prevent slippage, and the load is then lifted level.

If the block and crane hook is not close enough to the center of gravity of the load, the operator can lower the load enough to relieve tension on the sling, which releases the brake, and then move the crane hook over a little to the true center of gravity. On applying power, the ropes readjust themselves.—*Macwhyte Co., Kenosha, Wis.*

• • •

Internal Grooving Tool

Even unskilled labor, it is claimed, can use the new "Truarc" internal grooving tool with speed and accuracy. This device, which can be used with any ordinary drill press, turret lathe or boring mill, operates smoothly by finger-tip pressure, and assures a concentric recess. A Vernier thimble controls the diameter of the groove and grooves can be located from either top or bottom of a hole.

The tool is compactly designed, with self-contained bushings and cutters.—*Waldes Koh-I-Noor, Inc., Long Island City 1, N. Y.*

• • •

Two Cooling Towers

Two new mechanical draft cooling towers, recently introduced, are designed for either indoor or outdoor operation. In one, the air propulsion unit consists of a slow-speed double-inlet blower, resulting in very quiet operation. This tower, in five frame sizes, is

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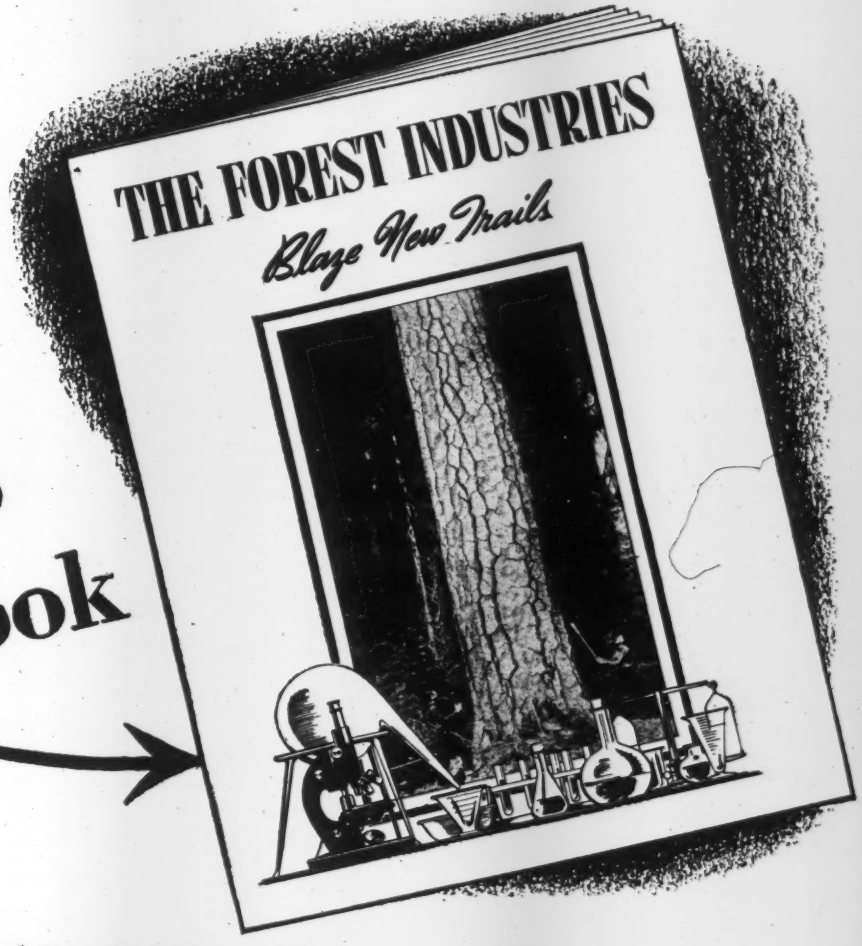

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This new book will be very helpful to executives, plant superintendents, chemical engineers, structural engineers and others in the wood-working, wood-chemistry and building fields.

It emphasizes the importance to all industry, of wood and its by-products and its derivatives —tells of new things ahead.

The new TECO services, now available through the Wood Products Development Shop and the Wood Chemistry Laboratory, are described for the benefit of those who may have problems concerning the physical, mechanical and chemical properties of wood and wood products. Learn how to make use of TECO SHOP-LAB equipment and technical staff in solving some of your postwar problems. Write at once for your copy—fill in and mail the coupon.

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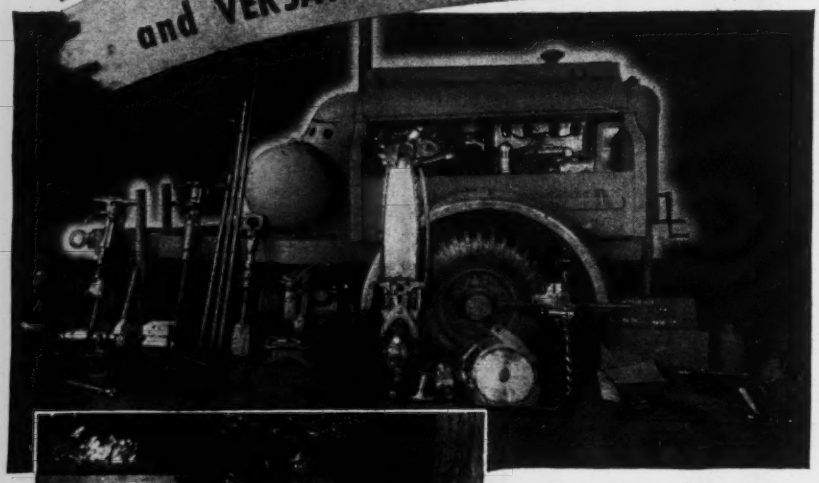

Air tool used by Royal Canadian Engineers — a Waukesha Engine powered Canadian Ingersoll-Rand Portable Air Compressor, complete with auxiliary equipment including a chain saw for felling trees, power hand saw for heavy timber construction, air operated auger, grinding stand and sump pump.

●

Making repairs at battle front — Royal Canadian Engineers using an air hoist, mounted on a tree trunk, to pull a drag scraper. *Overseas Photo Courtesy of Dept. of National Defense (Canada).*

Compressed air is "ammunition" for the front-line Royal Canadian Engineers who repair damaged bridges and construct new ones, build roads, landing fields and advanced bases. *Waukesha-powered* Canadian Ingersoll-Rand Portable Air Compressors give their pneumatic tools the mobility and versatility so vital to battle-winning efficiency.

The Waukesha Engine and the compressor are joined in a single unified assembly—for complete reliability. All the advantages of multi-cylinder power—quicker acceleration, clean combustion, cool valves and fuel economy with more power—are built into this compact, sturdy, 4-cylinder Waukesha Engine.

Until victory, every Waukesha is a war-work engine. Then there'll be Waukesha Engines . . . gas, gasoline, or diesel fuel . . . . for shovels, cranes, hoists, pavers, mixers, graders, surfacers, tractors or any peacetime industrial power machinery. Consult Waukesha now about your own future engine needs.

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suitable for the water-cooling needs of refrigeration condensers up to 20 tons capacity.

The other type of tower, in which the air inlet supply is obtained through the rear, uses aluminum alloy propeller-type, induced-draft fans. In single fan assemblies, 11 frame sizes are available; there are 5 twin-fan frame sizes.—*Binks Mfg. Co., Cooling Equipment Division, 3114-40 Carroll Ave., Chicago, Ill.*

• • •

Dust Collector

Based on the principle of hydrostatic precipitation, a new Type "N" Roto-Clone dust collector is said to be compact and easy to install; its absence of moving parts helps safe control of

magnesium and explosive dusts, etc. The collector cleans air by a combination of centrifugal force and close intermixing of water and dust-laden air. The air, forced through the stationary impeller, makes a heavy sheet of water move along the impeller blades, creating a water curtain in the form of a reverse S through which the air must penetrate.

This Type "N" collector, in three classes and thirteen sizes, exhausts air columns from 1,000 to 25,000 cfm.—*American Air Filter Co., Inc., 215 Central Ave., Louisville 8, Ky.*

• • •

Alkali and Acid Resistant Cement

Resistant to most organic and inorganic acids, alkalies of any degree of concentration, oils and solvents, a new furane-base resin cement is said to have high compressive and tensile strength. This product, Duracite, can be used as mortar for acid-proof masonry in tank linings, floors, sewers, etc., at temperatures above 350 deg. F.

Duracite, in liquid or powder form, can be stored indefinitely before mix-

[PUMP TIPS FROM ALLIS-CHALMERS—ONE IN A SERIES]

How to make SHAFTS Last Longer . . .

The Allis-Chalmers "Electrifugal" Pump is a unit-designed pump . . . with both impeller and motor mounted on one shaft and in one frame. The next time you need new pumps . . . look into the extra efficiency, ruggedness and long life of Allis-Chalmers centrifugal pumps . . . the "Electrifugal" . . . and all types for every purpose.

WHERE YOU HAVE an Allis-Chalmers "Electrifugal" Pump . . . shaft and rotor pictured at left . . . you don't have an alignment problem—because *both* impeller and rotor are mounted on *one* shaft.

However, many pumps in use today are coupled to a separate motor, and how well the two are aligned has a lot to do with how long the shaft lasts . . . and the pump and coupling too . . . because misalignment starts all three fighting each other!

Here are a few tips which will help you get longer life out of pump shafts:

▶ See that pump and motor coupling flanges are parallel . . . both vertically and axially . . . and that they are kept that way!

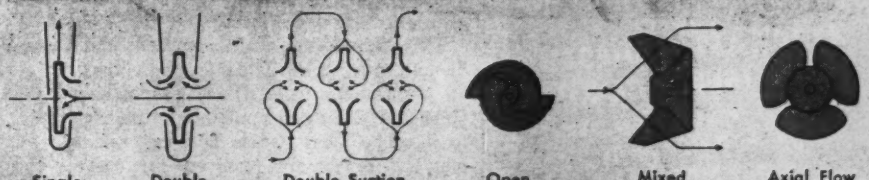
▶ If misalignment recurs frequently, check foundations, piping, bolted connections.

▶ In the case of boiler feed or other pumps which reach high operating temperatures, be sure that alignment of motor and pump is checked after *both* have been operating. Otherwise they might develop misalignment from unequal expansion.

▶ If you haven't done so already, send for your *free* copy of "Handbook for Wartime Care of Centrifugal Pumps". Contains *no* advertising. ALLIS-CHALMERS MFG. CO., MILWAUKEE 1, WISCONSIN. A 1707

ALLIS-CHALMERS PUMPS

Allis-Chalmers builds all types and variations of pumps shown at right. Capacities from 10 to 150,000 gpm—heads to 2500 lbs.



ADECO
NOZZLE TESTER
Keeps Diesel Engines Running Efficiently

TESTS FUEL INJECTORS AND HYDRAULIC DEVICES At Pressures Up To 10,000 p.s.i.

To keep diesel engines operating at peak efficiency, this portable, precision-built Adeco Nozzle Tester is indispensable.

Light in weight yet built for heavy-duty service, it enables any mechanic to make quick, accurate tests on injector opening pressure, spray pattern, etc., and detect stuck needle valves and leakage around valve seats. Tests both large and small injectors, on bench or engine, at pressures up to 10,000 p.s.i. Prevents costly delays and possible damage to engine.

Ideal for testing hydraulic devices.

Write for bulletin on this practical, low-cost unit.

ADECO
AIRCRAFT & DIESEL EQUIPMENT CORP.
4411 NO. RAVENSWOOD AVE.
CHICAGO 40, ILLINOIS

ing. As this product is 100 percent resin, it has uniform viscosity and sets quickly, by internal chemical reaction. —*The U. S. Stoneware Co., 5300 East Talmage St., Akron, Ohio.*

• • •

Drying Lamps

Within the glass bulb of the General Electric 250-watt R-40 infrared drying lamp there are over 4,000 deg. of controlled heat. The radiant energy from this source is controlled by coating the inside of the specially designed bulb with an efficient infrared reflecting material, and hermetically sealing the bulb. These drying lamps are designed with a fixed focus to provide smooth distribution and high concentration of radiant energy.

Such lamps have been found useful for field and laboratory testing of concrete and asphaltic materials; they are priced under $2.—*General Electric Dealers.*

• • •

Trigonometry Dial-Charts

Three "revolving dial window" charts have been evolved for trigonometric calculations, each with a manual explaining its use and how to work problems. The Plane "Trig-Easy" chart is for plane angles and carries 48 accurate equations. The Compound "Trig-Easy" chart calculates unknown angles of compounds, true angles, drilling holes, unknown angles within cubes, cylinders, cones, etc. The Spherical "Trig-Easy" solves right angle and oblique spherical triangles, calculates an arc from a radius and vice versa, and includes a 6-decimal radian conversion table.

These pocket-size calculators are of cardboard, coated to resist dirt and grease.—*E. H. Needham, Culver City, Calif.*

• • •

Fluorescent Luminaire

A combination of half glass-diffusion and half lamp-shielding has been incorporated in the new "Eggcrate Aristolite," for four 40-watt fluorescent lamps. The eggcrate louvres shield the lamps in the center portion of the fixture, thus providing strong, efficient down-lighting, while the glass panels give diffused side-lighting.

This luminaire, with panelled and die-cut ends, is available for individual or continuous installation, suspended from the ceiling, or mounted directly to it. The glass panels and eggcrates may be separately removed for easy maintenance.—*The Edwin F. Guth Co., 2615 Washington Ave., St. Louis 3, Mo.*

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ARMY E NAVY

Actual photograph of underwater cutting

Whether it be an underwater cutting torch which helped to salvage the damage of a treacherous attack at Pearl Harbor or a welding and cutting unit at an important Army air base or aboard ship, there is one primary qualification such equipment must possess—DEPENDABILITY.

Victor equipment is dependable in operation and the sturdiness of its construction greatly lessens repair and maintenance problems.

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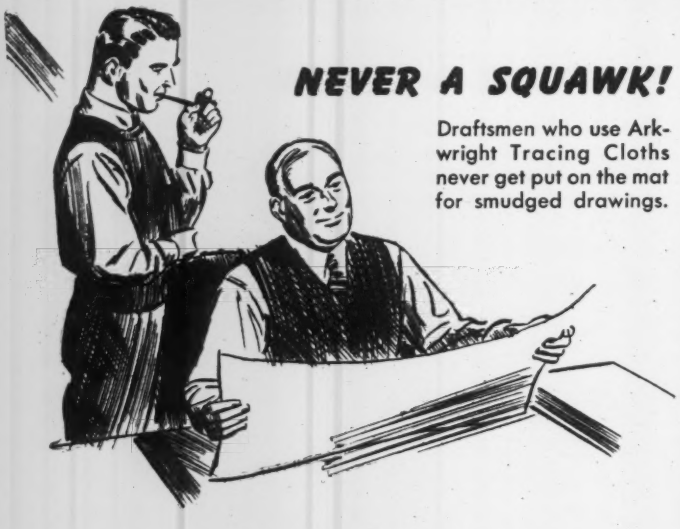

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Draftsmen who use Arkwright Tracing Cloths never get put on the mat for smudged drawings.

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at erasures. They erase easily and neatly — no smudges. Take re-inking beautifully, too!

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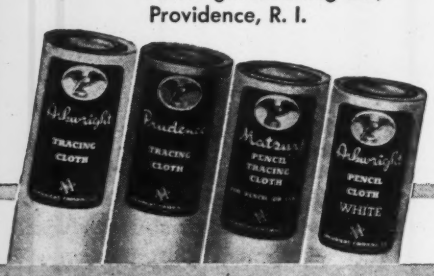
Another reason why many draftsmen rate American-made Arkwright Cloths head and shoulders over everything else! Try them. Arkwright Finishing Co., Providence, R. I.



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AMERICA'S STANDARD FOR OVER 20 YEARS

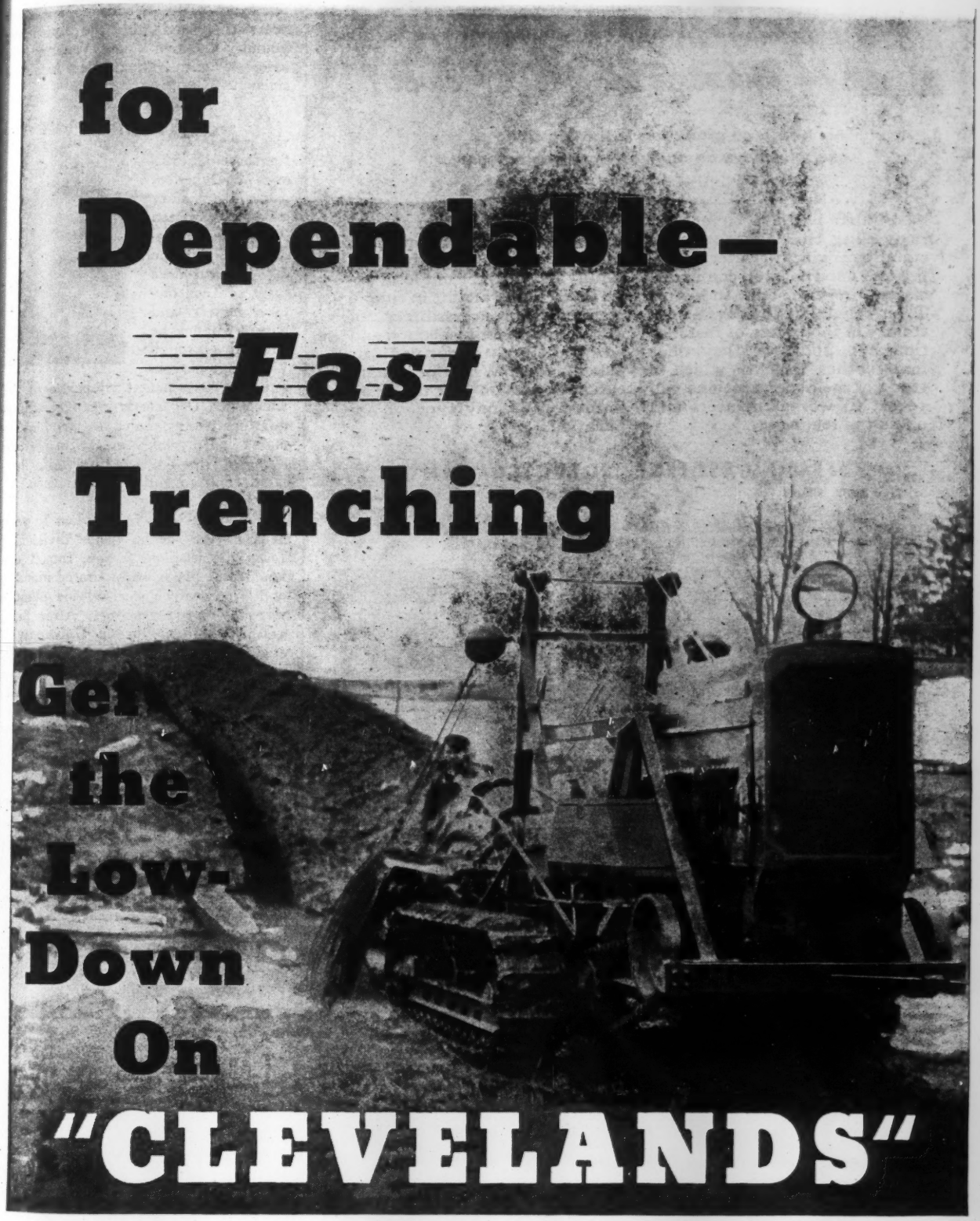
Manufacturers' Activities

N. B. GRAHAM, formerly vice-president in charge of industrial sales for Elgin Water Softener Co., recently became associated with Graver Tank & Mfg. Co., Inc., in charge of water treating and process equipment sales in the Tampa, Fla., area. Mr. Graham has a 20-year record in the water treating field and is widely considered an authority on the subject. He will make his headquarters at Tampa, covering western Florida and portions of the gulf coast area.

E. J. WHETZLE has been named advertising manager of the International Derrick & Equipment Co., Columbus, Ohio. He was previously advertising manager of the J. D. Baird Co., Shreveport, La.

Corwin Carleton Abbott, 56, who was recently appointed sales manager of the gas products division, Pittsburgh Equitable Meter Co., died in Cleveland, Ohio, May 8, while attending a committee meeting of the American Gas Association. Mr. Abbott became connected with the Pittsburgh firm in 1936, and previous to his sales appointment had served as acting chief engineer since 1941. He is credited with the development of many regulating and control devices that are widely used on war instruments. Before going to Pittsburgh he was an engineer for the Connelly Iron Sponge and Governor Co. of Chicago. Mr. Abbott, a graduate of Purdue University, was a commissioned officer in the Field Artillery in World War I.

JOHN T. WOODSON, formerly southeastern sales manager for National Cast Iron Pipe division of James B. Clow & Sons, Birmingham, Ala., has been appointed southern sales manager, and will serve both southeastern and southern



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THE ANSWER TO...

"What Stand-by Power?"

Assurance of protection is the big thing to any one who buys an engine for emergency power.

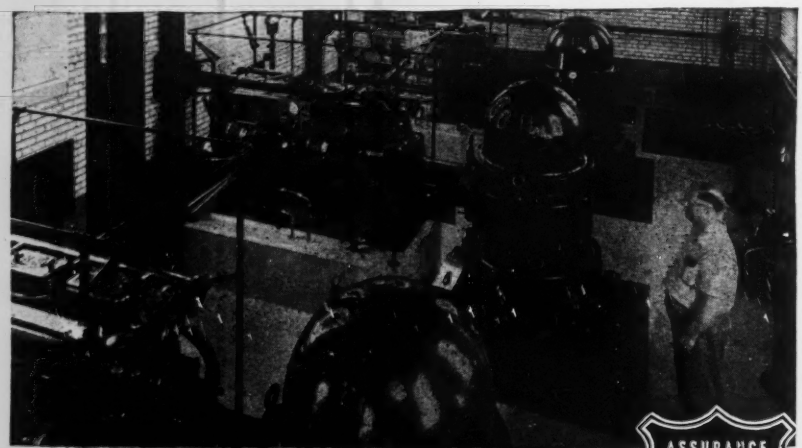
FOR over forty years Buffalo Engines have been providing this assurance as stand-by engines in water works, fire and flood control, communications service and industry. Their reliability is proven constantly in thousands of installations. In addition, they offer many other benefits which a study of their specifications will reveal to works engineers and operating managers.

Buffalo Engines deliver their full rated power and run at constant speed, quietly, cleanly and without vibration. Their design is fully developed from long experience, which results in simple maintenance, accessibility of working parts for inspection and adaptability to convenient plant layout. Write for specification sheets for your file or information on any type of application.

BUFFALO GASOLENE MOTOR COMPANY

DEPT. NR-65 BUFFALO 13, N. Y., U. S. A.

3—RAB-8 BUFFALO Engines used in Flood Control Work—at the Call St. Pumping Station, Chicopee, Mass.



BUFFALO ENGINES — 100 H. P. THROUGH 750 H. P.— IN GENERATOR AND PUMPING SETS FOR WATER WORKS — AIRPORTS — COMMUNICATIONS — FLOOD CONTROL — HOSPITALS — INSTITUTIONS — MINES — MOVABLE BRIDGES — THEATRES — SEWAGE PLANTS.

ASSURANCE of PROTECTION

territories. Mr. Woodson, for many years connected with the Lynchburg Foundry Co., Lynchburg, Va., has been associated with National Cast Iron Pipe since 1940.

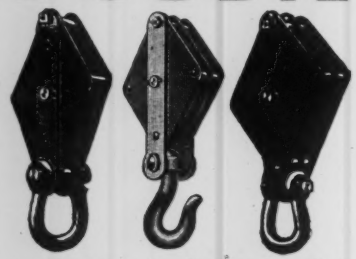
CARL F. OECHSLE has been appointed vice-president in charge of sales of Ransome Machinery Co., Dunellen, N. J., a subsidiary of Worthington Pump and Machinery Corp. The sale of Ransome's line of contractor's mixers and pavers will now be handled through Worthington's construction equipment department, of which Mr. Oechsle is manager. Headquarters of this sales department remains in Holyoke, Mass., with regional offices in New York, Washington, Cleveland, Chicago and San Francisco.

W. O. SPRINGER, for the last 15 years head of the special steels division of Joseph T. Ryerson & Son, Inc., Cleveland, Ohio, has been appointed manager of the company's steel-service plant, it was announced recently. After being graduated from Purdue University in engineering, Mr. Springer worked for several years for the Babcock & Wilcox Co. He joined Ryerson in 1929 in the alloy, tool and stainless steel department in Chicago and soon after was appointed head of the special steels division in Cleveland.

THE MARBLE INSTITUTE of America was formed at a meeting of the members of the marble industry at Cincinnati, Ohio, recently. Its function is to co-ordinate and disseminate information about marble to architects and the general public. Elected directors were:

President, B. A. Colonna, president, Colonna & Co., Inc., New York; vice-president W. W. Getchell, president, Northwestern Marble Corp., Minne-

DOBBIE



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OPEN STEEL FLOORING
Pressure Formed
90% Open Area
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All kinds of Structural Timbers and Lumber Pressure Treated with Creosote Oil or
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205 HALF-YARD

Saves ONE-HALF *the Cost* OF AN EXTRA PULL SHOVEL BOOM

You save one-half the cost of separate pull shovel boom. The same features that make the Two-in-One boom a better shovel boom, make it a better pull shovel boom as well. Rigidity and strength, built in to meet shovel requirements, eliminate dipper weaving on the pull shovel, makes possible full use of sidecutters. The boom foot drum that gets a double cable pull into the shovel crowd action also gets a double cable pull into the pull shovel digging action.

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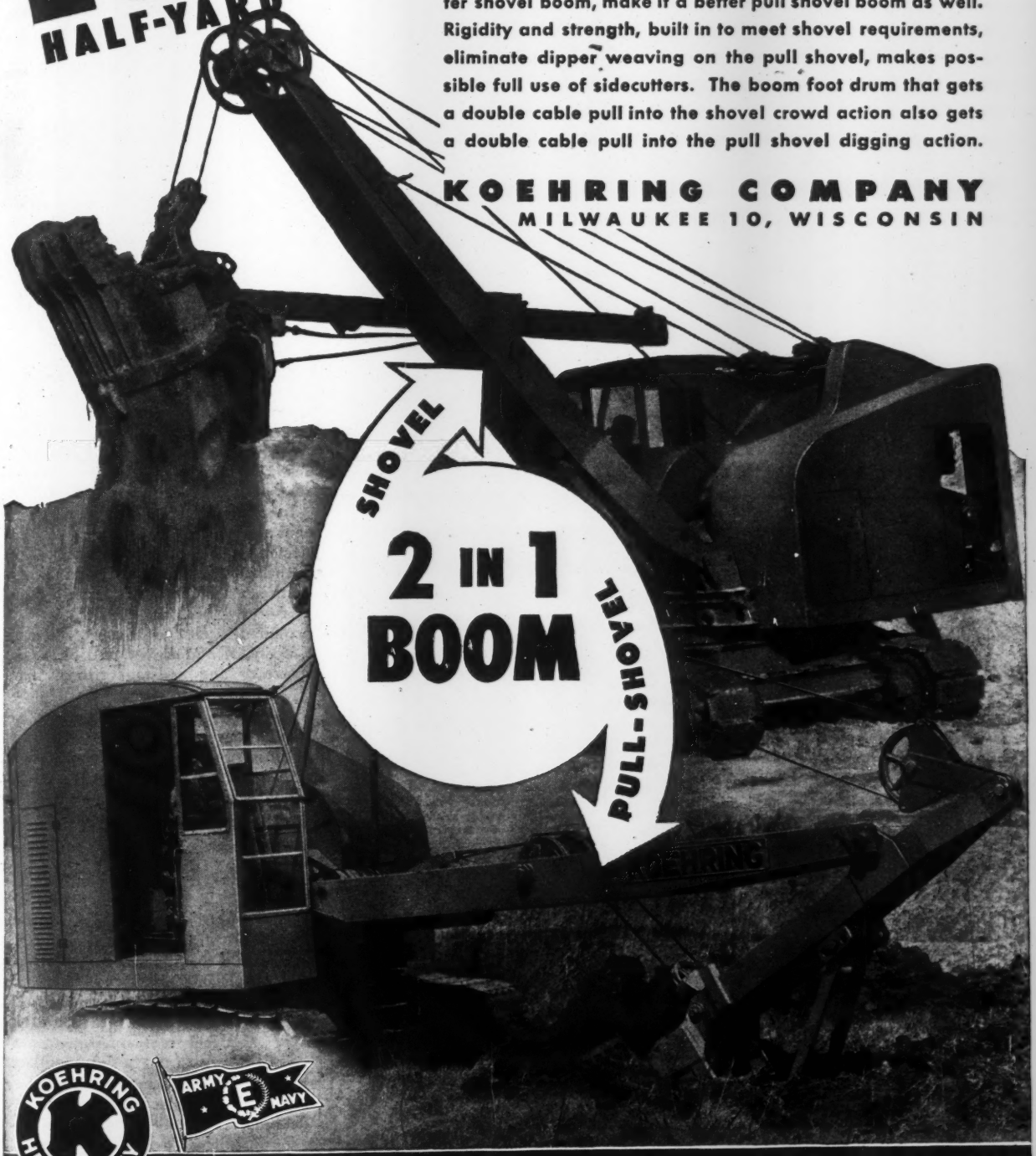
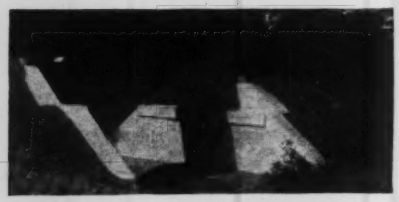


HEAVY-DUTY CONSTRUCTION EQUIPMENT

CEMENT GUN COMPANY

"GUNITE" CONTRACTORS

GENERAL OFFICES—ALLENTOWN, PENNA., U.S.A.



RAILROAD BRIDGES REPAIRED WITH "GUNITE"

To the left are three of many B. & O. Railroad bridges which we repaired with "GUNITE" last year. The original concrete was seriously disintegrated in the abutments, wing walls and back walls. The deteriorated concrete was all chipped away, the surfaces sandblasted and mesh reinforced "GUNITE" placed 2" to 12" in thickness to restore the structures to original dimensions. On the upper two bridges shown the track was shored up and entire new back walls built of "GUNITE".

Other "GUNITE" work which we completed last year for several railroads included tunnel lining, coaling station repairs, roundhouse roof repairs and train shed repairs.

Our 72-page bulletin 2300 describes scores of profitable uses of "GUNITE". Write for your copy.

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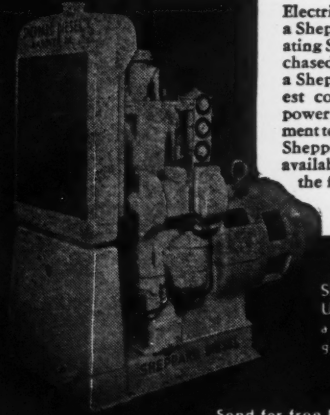
Electricity generated with a Sheppard Diesel Generating Set is electricity purchased at a saving . . . for a Sheppard converts lowest cost fuel into ready power. It's sound management to lower power costs. Sheppard Diesels are now available—write today for the facts.



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apolis, Minn.; secretary, Carl Stafford, vice-president, Tennessee Marble, Inc., Knoxville, Tenn.; treasurer, Chester A. Smith, president, Chester A Smith Co., Columbus, Ohio; and James Cullo, president, James Cullo & Son Marble Co., New York; E. M. Frig, president, Interior Marble & Tile Co., Inc., Cleveland, Ohio; Roy Mayes, president, Carthage Marble Corp., Carthage, Mo.; and Fred J. Plimpton, vice-president, Vermont Marble Co., Proctor, Vt.

AT THE ANNUAL MEETING of directors of The Marion Steam Shovel Co., held recently in Marion, Ohio, Maynard E. Montrose was elected president and general manager.

Mr. Montrose, a 42-year-old executive from Los Angeles, Calif., has had a broad industrial experience. In 1929, he joined the General Electric Co., and was employed by it in various capacities until 1935, when he became associated with the Lane-Wells Co., Los Angeles. Since that time he has served the company in important managerial positions and was executive vice-president until his recent resignation.

In addition to Mr. Montrose as president and general manager, the directors elected J. M. Strelitz, Marion, Ohio, chairman of the board and general counsel, Alec Gibson vice-president and treasurer, John P. Courtright, vice-president in charge of sales, Harvey T. Gracely, vice-president, and M. Virden, secretary and assistant treasurer.

LLOYD B. SMITH and Anthony von Wening have been elected to the board of directors of the A. O. Smith Corp., Milwaukee, Wis. Morris J. Vollmer, formerly assistant to the president, has been named assistant secretary and treasurer.

E. C. BAYERLEIN, who has been vice-president and treasurer, has been elected chairman of the board of the Nordberg Mfg. Co., Milwaukee, Wis. James A. Friend, former vice-president and purchasing agent, was made vice-president in charge of purchasing; Ervin H. Hoeft, former production manager and general superintendent, is vice-president in charge of manufacturing; Chester W. Foster, former controller, is treasurer; Harold L. Vandenberg, controller; Arne Johnson, superintendent; Percy Des Champs, assistant superintendent; Roland W. Bayerlein, manager, heavy machinery department; and John M. Friend, production manager.

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A perfected, highly efficient portable steam generator — on wheels — you can tow this unit with car or truck anywhere you need steam — tank-car siding, construction site, material yard or other location.

In tank-car heating with the Cleaver-Brooks heater you have hot dry steam flowing to the car coils from a cold start in 20 minutes or less. And you can keep going all day with the least work and bother because a Cleaver-Brooks tank-car heater requires less fuel and water. The famous and exclusive four-pass flue travel construction means low fuel consumption; the turbine type condensate return system cuts water loss—every drop of condensate goes back to heater under pressure.

Built for full capacity — full-time work — Cleaver-Brooks tank-car heaters will give you the most in production hours on the job. Wherever in service, Cleaver-Brooks are usually given the tough jobs because of their known reliability.

Write today—get bulletins and complete information from Cleaver-Brooks—the pioneers and originators of tank-car heaters and bituminous boosters.

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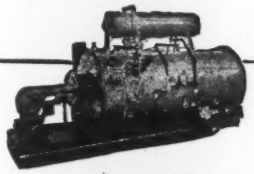
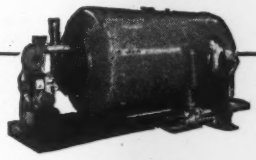
5107 N. 33rd Street • Milwaukee 9, Wisconsin



Automatic Steam Plants
Completely self contained; highly efficient; require only simple piping connections to place in operation. Fully automatic fuel-oil burner; condensate recovery and feed water pumping system; no stack needed, sizes from 20 to 500 h.p.; pressures 15 to 200 lbs.



Hot Water Boosters
Oil-fired; fully automatic or manual operation; no licensed engineer needed; two capacity sizes: 3000 gals. storage tank for 1600 gals. of water heated 150° F. per hour; 1500 gals. storage tank for 800 gals. of water heated 150° F. per hour.

Portable Pumping Boosters
Heats bituminous material by direct firing in one operation, loading directly to distributor, relay truck or returning to tank car. Two sizes, truck mounting or 4-wheel trailer.

Portable Tank-Car Heaters
Available in 2 and 3 tank-car sizes. Oil-fired with exclusive four-pass flue travel; dry-coil steam condensate return under pressure — no water or heat loss. Provides a portable source of steam wherever needed.

Cleaver-Brooks

Pioneers and Originators of ★TANK CAR HEATERS ★BITUMINOUS BOOSTERS ★AUTOMATIC STEAM-PLANTS

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For Cities, Towns and Industries

Practically all of Layne's emergency War Plant Water System construction has been finished. Essential Civilian Industries, Cities, Towns and Villages are next in line. The entire Layne organization is now devoting almost full time to peace-time Water System installation. This means that Industrial, and City Officials — Engineers and Plant Superintendents, can now proceed with their Well Water Sytems development plans.

The natural choice of Well Water Systems and Pumps will be those built by Layne. No other make can possibly provide so many outstanding and thoroughly proven features of sturdy construction, long lasting quality or unmatchable efficiency.

Layne builds Well Water Systems of all sizes to fulfill the needs of the largest industries and cities down to those of the progressive little village. Based on low operating cost, and long life, Layne Well Water Systems are the finest investment an Industry, City, Town or Village can make.

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LAYNE

WELL WATER SYSTEMS
VERTICAL TURBINE PUMPS

ERNEST C. LOW, general manager of sales of John A. Roebling's Sons Co., Trenton, N. J., who has been associated with the company since 1910, has been named vice-president in charge of sales; John D. Thompson, works manager, who has been with Roeblings since 1940, becomes vice-president in charge of production; and Charles M. Jones, manager of engineering and connected with the organization since 1926, is now vice-president in charge of engineering. Archibald W. Brown, treasurer of Roebling's and with the company since 1902, has been elected a member of the board of directors.

SAM L. HARVEY, formerly zone manager for the International Harvester Co., industrial division, Atlanta, Ga., has resigned and joined the North North Carolina Equipment Co. of Charlotte and Raleigh, N. C. He will become vice-president in charge of sales, tractor division, with headquarters in Charlotte.

THE AMERICAN MANGANESE STEEL division of the American Brake Shoe Co., announces the advancement of J. L. Mullin from general superintendent of foundries to vice-president in charge of operations. He will be at the Amsco headquarters, Chicago Heights, Ill.

Associated with the manganese steel industry since 1914, when he joined the Edgar Allen Manganese Steel Co., forerunner of the present Brake Shoe Co., division, as a clerk in the annealing department, Mr. Mullin has advanced steadily from local purchasing agent, foundry superintendent, works manager at the New Castle, Del., plant, and general superintendent of foundries.

The division manufactures manganese steel castings for many industrial and war uses, as well as dredging and material handling pumps, reclamation and hard-surfacing welding materials and power shovel dippers.

THE PEERLESS PUMP DIVISION of Food Machinery Corp., which operates a plant in Canton, Ohio, has purchased the Quincy, Ill. properties of the Day-

Black on White for Better Sight

WYTEFACE "A" Steel Tapes have *raised* black graduations on a crack-proof white surface. Easy to read in any light, from any angle. Faster measurements with fewer errors. Designed for hard service. White background is protected by raised steel markings and rims. Resists abrasion from rails, pipe, rocks, concrete. Protected against rust. See your dealer. Write for catalog.

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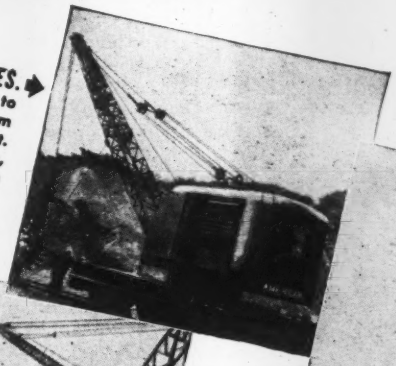
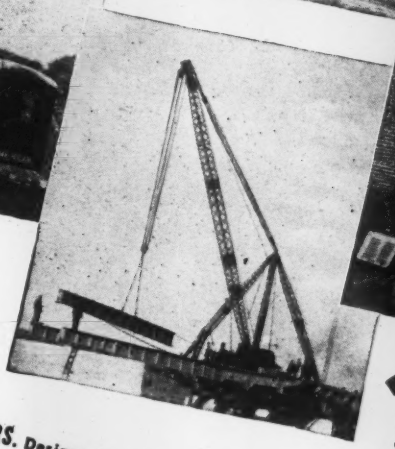
HOISTS. A complete line of 1, 2, 3 and 4-drum types in capacities up to 250 tons. Steam, gasoline, Diesel or electric powered.

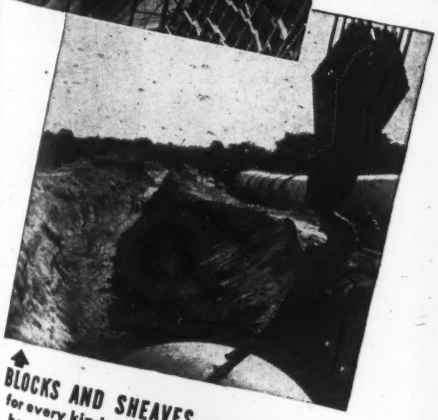
LOCOMOTIVE CRANES. Capacities from 20 to 40 tons with boom lengths up to 100 feet. Diesel, Diesel-electric, gasoline and steam types.





DERRICKS. Guy, stiffleg, steel erectors, gin pole, gallows frame, barge and special types. Choice of size, boom length and capacity.

REVOLVERS. Designed to the speed and capacity requirements of the particular project and with many mechanical superiorities.



BLOCKS AND SHEAVES. Types and sizes for every kind of wire rope service. All have heavier pins and axles and oversized forged hooks and shackles.

WE'RE CONCENTRATING *on making operators' and workmen's jobs easier and their time more productive. All movements and controls of American materials handling equipment for the construction industry have been designed or are being redesigned with this currently important advantage in mind.*

Ways of saving time for the construction industry have always been our primary objective. We constantly strive to slash seconds from operating cycles . . . move bigger loads faster . . . plan for easy assembly and erection . . . build equipment to give *better* service than expected. Be sure to talk over all your important jobs with an American field engineer *before you quote.*

AMERICAN MATERIALS HANDLING *for* EVERY INDUSTRY

AMERICAN HOIST & DERRICK CO.

Saint Paul 1, Minnesota

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Wherever wire rope is fastened . . . . use genuine **CROSBY CLIPS** *with the Red-U-Bolt*

The Extra Factor*

wrapped up with every foot of

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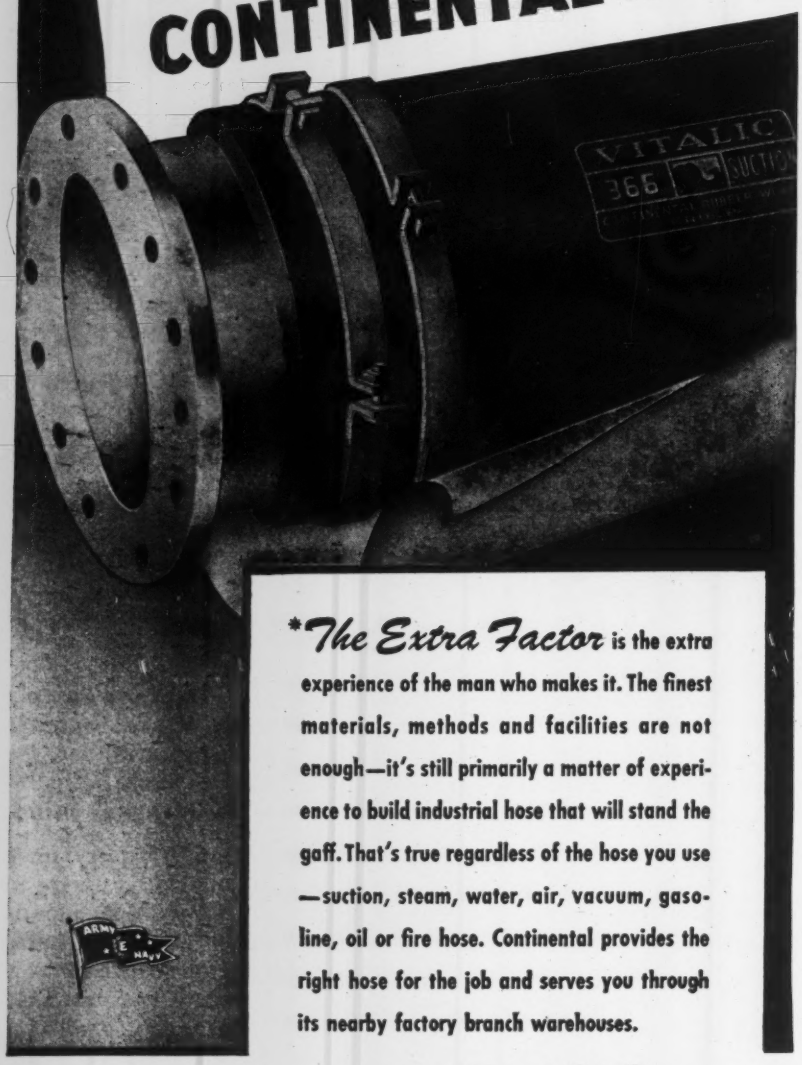

*The Extra Factor is the extra experience of the man who makes it. The finest materials, methods and facilities are not enough—it's still primarily a matter of experience to build industrial hose that will stand the gaff. That's true regardless of the hose you use—suction, steam, water, air, vacuum, gasoline, oil or fire hose. Continental provides the right hose for the job and serves you through its nearby factory branch warehouses.

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Boston, Mass.	Dallas, Texas	Hartford, Conn.	Memphis, Tenn.	Rochester, N. Y.
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Chicago, Ill.	Detroit, Mich.	Kansas City, Mo.	New York, N. Y.	San Francisco, Cal.
Cincinnati, Ohio	Evansville, Ind.	Los Angeles, Cal.	Philadelphia, Pa.	Syracuse, N. Y.

THIS YEAR Richard H. DeMott, vice president in charge of sales, SKF Industries, Inc., Philadelphia manufacturer of ball and roller bearings, is observing his 30th anniversary at SKF.

After receiving his engineering degree at Stevens Institute of Technology, Mr. DeMott's first job was with Worthington Pump Co., Harrison, N. J., at $1 per day. He soon left his shop job to become a draftsman with Crocker-Wheeler Co., Ampere, N. J., and this led to his first selling position as sales engineer for Westinghouse Lamp Company, Bloomfield, N. J.

Following considerable sales experience with other companies east and west, Mr. De Mott joined SKF in 1915 at its New York office, and when the company built its manufacturing plant in Hartford, Conn., he stayed on as New York sales manager. Promotions quickly followed as district sales manager, manager of industrial development, assistant sales manager, general sales manager, and finally vice-president.

B. F. LEASE has been elected president of Athey Truss Wheel Co. Mr. Lease, who, since July, 1944, had been vice-president in charge of sales, advertising and service, succeeds the late C. Kier Davis. He is well-known in the construction equipment manufacturing field, as well as among equipment distributors throughout the country.

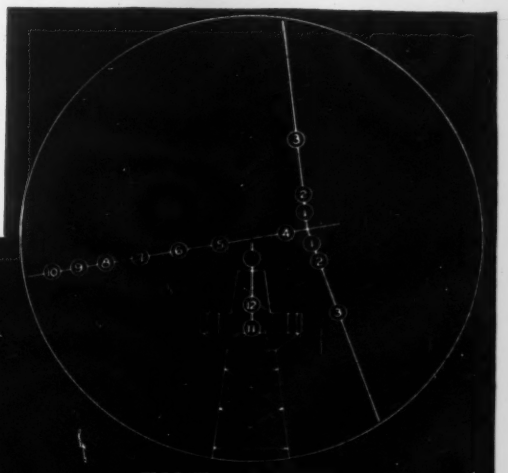
Mr. Lease started with Athey in 1911 as special representative, and advanced rapidly to district representative; manager, service and research; manager, domestic sales; vice-president in charge of sales, advertising and service; and now to president. Prior to joining the Athey organization, he served for many years with the Republic Truck Co. and Lynn Manufacturing Co.

AMERICAN FLOOR SURFACING MACHINE Co., Toledo, Ohio, has purchased controlling interest of the Buckeye Traction Ditcher Co., Findlay, Ohio. The company will continue the manufacture of heavy construction and road machinery equipment and expects to increase production through installation of additional machinery.

HARNESSING the wind

to light 2,000 homes

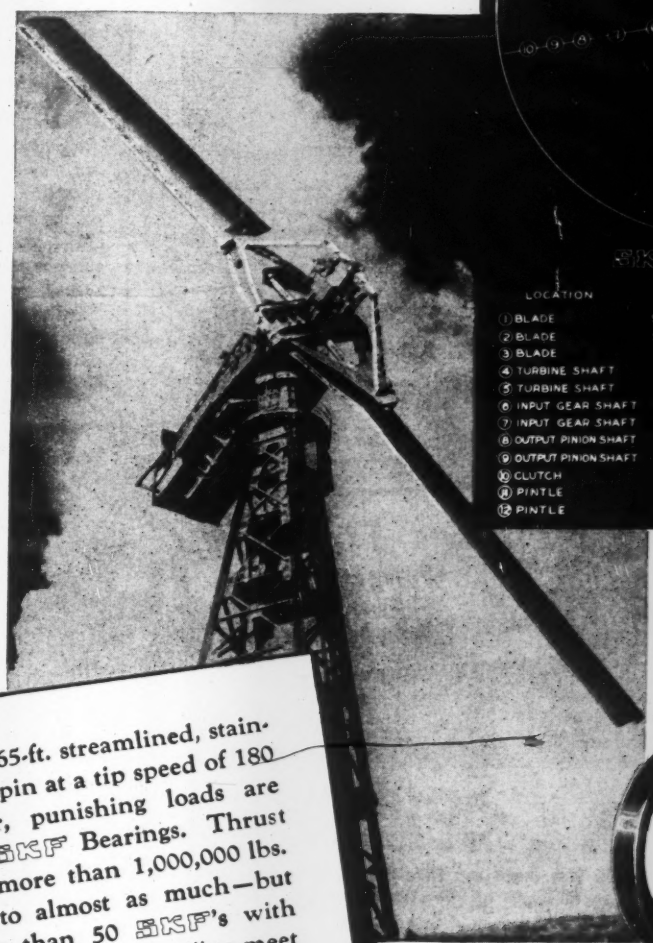
WITH SKF REDUCING FRICTION TO A VANISHING POINT



SKF BEARINGS

LOCATION	BEARING TYPE	BEARING DIMENSIONS BORE	O.D.	WIDTH
(1) BLADE	SPHER. ROLLER THRUST	14.500"	24.000"	6.750"
(2) BLADE	SPHERICAL ROLLER	11.8110"	19.6850"	6.2992"
(3) BLADE	SPHERICAL ROLLER	20.6661"	34.2520"	10.7087"
(4) TURBINE SHAFT	SPHERICAL ROLLER	24.8031"	40.5512"	12.4016"
(5) TURBINE SHAFT	SPHERICAL ROLLER	18.1102"	32.6772"	11.6535"
(6) INPUT GEAR SHAFT	SPHERICAL ROLLER	14.1732"	21.2598"	5.2756"
(7) INPUT GEAR SHAFT	SPHERICAL ROLLER	10.2362"	15.7480"	4.0945"
(8) OUTPUT PINION SHAFT	SPHERICAL ROLLER	6.6929"	12.2047"	3.3858"
(9) OUTPUT PINION SHAFT	SPHERICAL ROLLER	6.6929"	12.2047"	3.58"
(10) CLUTCH	SINGLE ROW BALL	8.2992"	11.4173"	1.8898"
(11) PINTLE	SPHERICAL ROLLER	11.8110"	19.6850"	6.2992"
(12) PINTLE	SPHER. ROLLER THRUST	14.500"	24.000"	6.750"

● *Built under the financial sponsorship of S. Morgan Smith Co. to the designs of Palmer Coslett Putnam, Boston engineer and inventor, this Smith-Putnam Wind Turbine, world's largest windmill perched on top a 110-ft. steel tower on 2,000 ft. Grandpa's Knob, Vt., is designed to feed 1,000 kw. into the power lines of the Central Vermont Public Service Corp. – enough electricity to light five 100-watt lamps for each of 2,000 families.*



● *The SKF Spherical Roller Thrust Bearing (see No. 1 in diagram) absorbs a maximum thrust load of 1,039,390 lbs.*

When these two 65-ft. streamlined, stainless steel blades spin at a tip speed of 180 miles per hour, punishing loads are imposed upon SKF Bearings. Thrust loads climb to more than 1,000,000 lbs. —radial loads to almost as much—but there are more than 50 SKF's with bores ranging from 1⅜" to 24⅘" to meet them. For bearings that convert maximum *wind* power into *paying* power . . . that provide an equalized load distribution insuring full bearing capacity and long life, men who do things never done before invariably use SKF's.

5816

SKF INDUSTRIES INC., PHILA. 34, PA.

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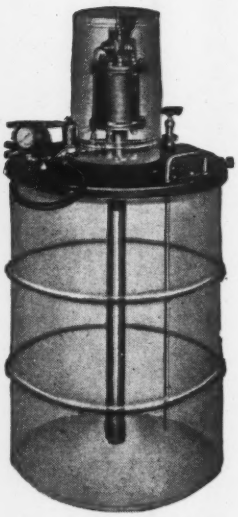
BEARINGS

Now! Spray Paints, Heavier Materials, etc.

. . . with the new Alemite

"VERSATAL" PUMP



Model 7804-C for red lead, fibre coatings, other heavier type materials. Also available —Model 7805-C for lighter materials; portable Models 7800 and 7802.

● Here's something entirely new and different for high-pressure spraying! It's the Alemite "Versatal" —a heavy-duty air-operated pump that can reduce labor and material costs up to *50% or more.*

This revolutionary new unit feeds paints, roofing materials, and other heavy or light consistency materials at a uniform rate to as many as six spray heads located several hundred feet away. Can be loaded *without* stopping operations. Automatic agitation keeps materials constantly circulated *without* use of mechanical agitator. Pump is easy to clean.

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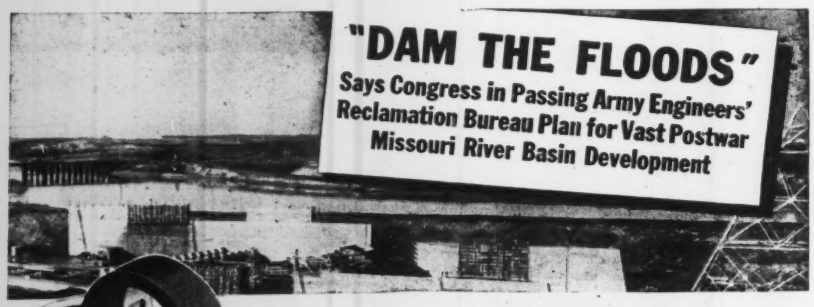
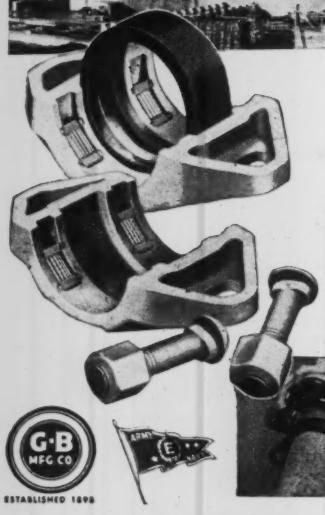


"DAM THE FLOODS"

Says Congress in Passing Army Engineers' Reclamation Bureau Plan for Vast Postwar Missouri River Basin Development



ROLAGRIP PIPE COUPLINGS

Will Play Important Time-Saving, Cost-Saving Role on All Types of Peacetime Construction Projects

Lightweight pipe can be used since threading, grooving or flanging are eliminated. To make the time-saving, leak-proof connections, gasket is simply slid over the two pipe ends, centered over the joint and the halves of the housing bolted together. Repairs or line changes can be made quickly and safely with Rolagrips. Only plain end pipe, new or used, need be stocked.

100% RECLAIMABLE

In some uses, the pipe itself may wear through completely and have to be renewed, but it is not necessary to renew Rolagrip Pipe Couplings. They are completely salvaged and used on one job after another. In addition, their flexibility and shock resistance combine to make them ideal for temporary as well as permanent lines.

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IVAN E. L. EIDE has been appointed district manager in charge of Oliver "Cletrac" industrial business in the Pacific northwest. He is well known in the industrial field with twenty years' experience in the construction and automotive industries as district representative for J. D. Adams Co.; in charge of industrial equipment at Billings, Mont. for Allis-Chalmers; district representative for Galion Iron Works and zone manager for Ford Motor Co.

THREE NEW APPOINTMENTS to the Gary Steel works management, Gary, Ind., have been announced by Carnegie-Illinois Steel Corp., subsidiary of U. S. Steel. They include: Arthur H. Hjortsberg, assistant general superintendent, succeeding Erle G. Hill, who resigned recently to accept other employment; Edwin H. Gott, assistant to general superintendent, in charge of service departments; and John J. Golden, division superintendent of the combined open hearths and central mills.

Born in Sweden and educated in the country's School of Mining and Metallurgy Mr. Hjortsberg has been with Gary Works since 1925. Mr. Gott is a graduate of Lehigh University. He first joined Gary Works in 1941 as plant industrial engineer following previous employment in industrial engineering with Carnegie-Illinois at Youngstown, Ohio. A veteran of 34 years with Carnegie-Illinois, Mr. Golden started as office boy.

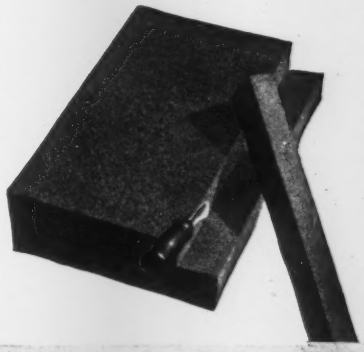
FRED M. SIME has been appointed district sales manager of the Macwhyte Co. for the Pacific southwest and Wm. Brett for the Pacific northwest.

JOHN HOWARD COLLIER, president of the Crane Co., Chicago, Ill., has been elected a director of the Allis-Chalmers Manufacturing Co., Milwaukee, Wis., according to an announcement by Walter Geist, president of Allis-Chalmers. Mr. Collier fills the post left vacant by the resignation of Capt. Lester Armour of Chicago, who has been in the service of the Navy most of the time since the outbreak of the war.

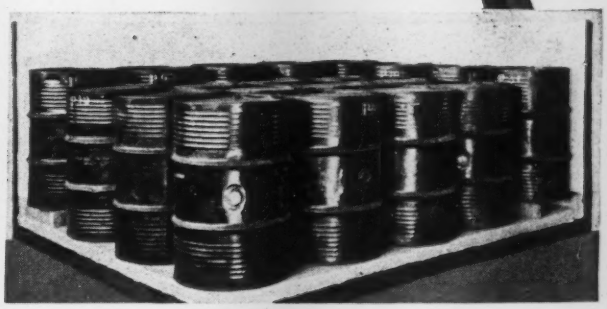
After attending Purdue University Mr. Collier joined the Crane Co. in 19[illegible] as an apprentice foreman. He progressed through many positions, including that of general manager in 19[illegible] and vice-president in 1933. In the latter capacity he served until 1941, when he became president.

The Versatile Insulation

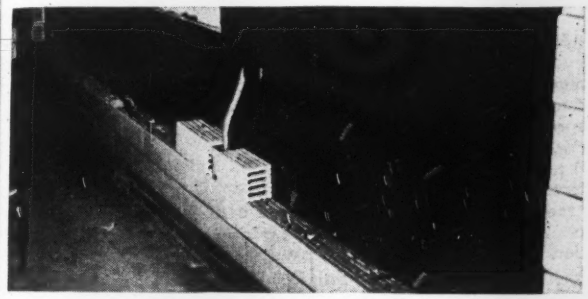
PC FOAMGLAS...



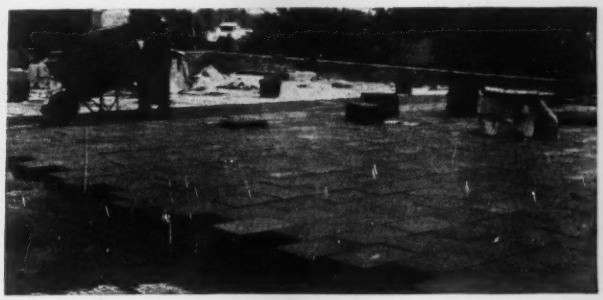
EASILY HANDLED—Light, rigid, strong, the big pieces of PC Foamglas are conveniently packaged, easily handled. They can be cut to fit around openings and obstructions right on the job. When you install PC Foamglas the first cost is the last cost.



STANDS THE LOAD—Under concrete wearing floors, PC Foamglas withstands pressure much greater than normal floor loads. It has proved able to maintain desired temperature levels over cold ramps and open loading platforms, to prevent heat travel from rooms below.



STAYS IN PLACE—In core walls, PC Foamglas becomes an integral part of the structure, can be tied in to brick, tile or other backing and facing. This rigid, cellular glass material does not pack down, slip, warp, or rot—it is damp-proof, verminproof, incombustible.



INSULATES PERMANENTLY—A firm, level base for roofing felt. PC Foamglas is so easily installed it speeds up the job. It insulates efficiently, protects roof slabs. Even a break in roofing felt entails no expensive repairs or replacement of PC Foamglas.

ON roofs, in floors and core walls, on tanks and other equipment, PC Foamglas has proved its efficiency in all sorts of plants where temperature and humidity levels must be maintained, condensation prevented.

Made of air-filled glass cells, PC Foamglas does not warp, check, swell, shrink or rot. It is impervious to moisture, vapor, fumes and acid atmospheres, elements that cause other materials to lose insulating efficiency. Freedom from repairs and maintenance makes its use a positive economy. Owners of all sorts of plants all over the country can tell you that PC Foamglas has licked many a tough insulating job—permanently.

Our specialists will be glad to consult with you on any problem that involves insulation. Also you will find a wealth of helpful information in the booklets we offer. Check the convenient coupon, mail it in today and your selection of literature will be sent to you promptly. Pittsburgh Corning Corporation, 632 Duquesne Way, Pittsburgh 22, Pa.

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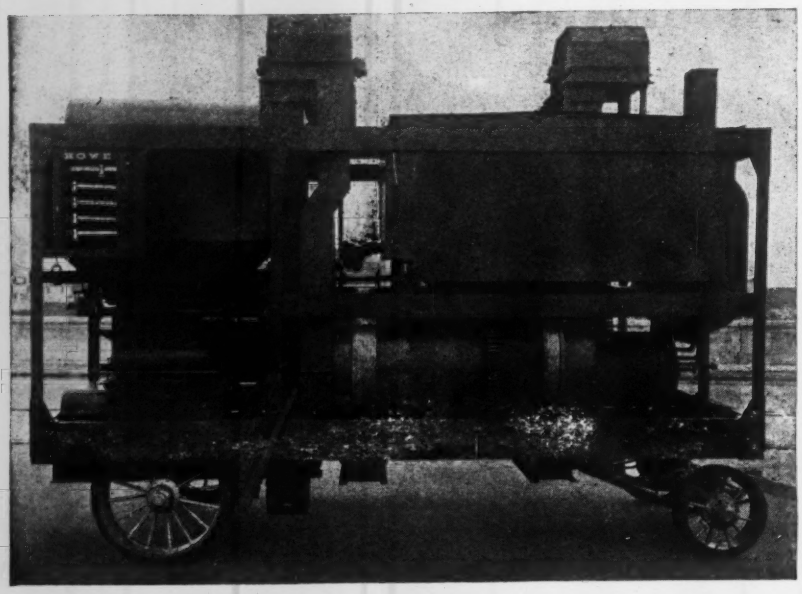
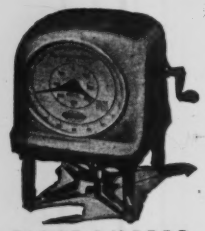
HERE IS A COMPLETE **ASPHALT PLANT!**



Designed Especially for Handling Repair Work Efficiently



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Modernize your Asphalt Plant by installing a Fluidometer Automatic Metering System.

● This H & B Patch Plant meets every requirement for speedy, economical repair work. May be set up as a stationary plant on steel columns, or used as a mobile unit—wheel mounted as shown. Will efficiently produce material to meet any standard hot or cold mix specifications. Capacity, 3 to 5 tons per hour. Gasoline or electric power unit optional. Rugged, double-shaft pug mill mixer. Collapsible hoist. SKF bearings throughout. Portable units have rubber-tired wheels and a short turning radius—conforming to highway and street regulations.

Bulletin R-402, giving complete information and flow diagram, will be sent on request.

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Manufacturers' Publications

Bilge Pumps—Automatic electric heavy duty bilge or sump pumps are described in a particularly complete 20-page illustrated bulletin. *Yeomans Brothers Co., 1433 N. Dayton Street, Chicago 22, Ill.*

Construction Equipment Rental—The third edition of the Associated Equipment Distributors' compilation of rental rates for construction equipment, known as "The Green Book," is now available at cost. The schedule is based on Maximum Price Regulations 134 and 136 of OPA. The regulations set forth are an exact copy of the OPA regulations and, except where noted, the operating schedule of rental rates on construction machinery is likewise an exact copy of the rental rates set forth in MPR-134. However, the eye strain caused by studying the small type of the printed OPA regulation is overcome by the "Green Book's" use of bold, black type.—*Associated Equipment Distributors, National Press Bldg., Washington 4, D. C.*

Highway Machinery—A new catalogue devoted to street and highway construction and maintenance machinery describes asphalt plants, aggregate driers, heating kettles, tractor loaders, pavement repair trucks, kerosene torches and concrete vibrators.—*White Manufacturing Co., Elkhart, Ind.*

Suction Pumps—The first catalog of a series of ten describes single stage double suction pumps. When the series is complete a stiff cover binder will be furnished. — *Economy Pumps, Inc., Hamilton, Ohio.*

Power Broom—A 2-way power operated broom is illustrated and described in a new folder. It is said to be

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Awarded the Gold Medal for Safety
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WE CAN IMPROVE
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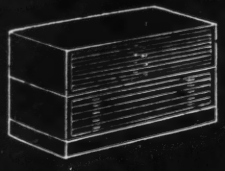
Steel filing units now available. Write for prices and information on delivery.



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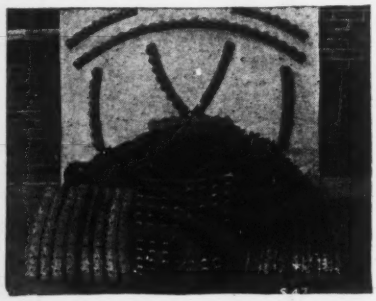
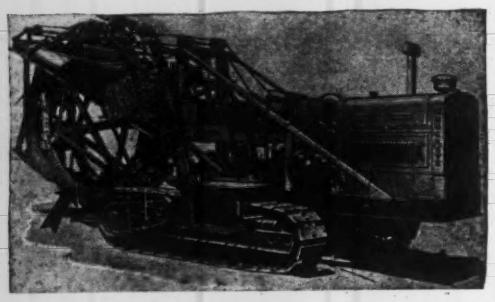
"The Toughest Steel Known"— for Construction Equipment Wearing Parts

Leading manufacturers of trenchers, power shovels, loaders, bulldozers and other construction equipment have found that the use of austenitic manganese steel enables their machines to stand up in severe service with a minimum of out time for replacements.

Manganese steel parts, such as cutting edges and corner bits, crawler treads, gears, sprockets, sheaves, conveyor chain, dippers, buckets and digging teeth are widely used by manufacturers who value the reputation of their machines for uninterrupted service.

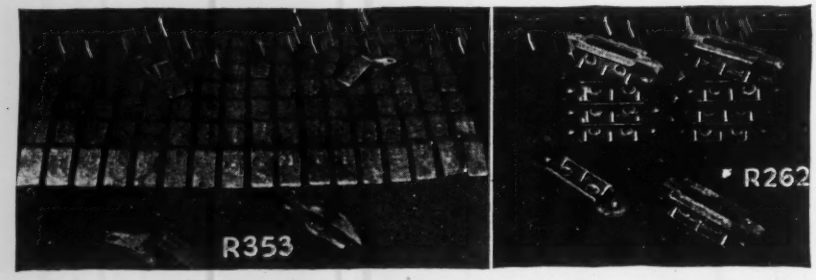
The manganese steel bucket teeth (R-353) and links (R-262)





are used on a large Buckeye Trencher employing a digging ladder or boom instead of a digging wheel.

Austenitic manganese steel has "what it takes" for this service. The meshing of gears and pinions always implies friction. Manganese steel work-hardens on the surface to as much as 550 Brinell, so a hard skin is always present to resist abrasive wear.



A case in point is the Buckeye Model 12 Trencher pictured above. The arrow indicates where the manganese steel gear segments shown in Picture S-47 are applied to the rotary digging wheel of the trencher. Placed end to end, they form a circle and there is one complete segmental gear on each side of the digging wheel.

Shocks and other stresses are involved in trencher operation. The inherent body toughness of work-hardened manganese steel withstands these ordinarily destructive forces.

Many manganese steel parts for construction equipment are described in Bulletin 1143-CI.

How Amsco "Conservative Welding Rods" restore worn equipment parts described in Bulletin 941-W

Amsco
AMERICAN MANGANESE STEEL DIVISION
Chicago Heights, Illinois
FOUNDRIES AT CHICAGO HEIGHTS, ILL.; NEW CASTLE, DEL.; DENVER, COLO.; OAKLAND, CALIF.; LOS ANGELES, CALIF.; ST. LOUIS, MO.
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of simple design, lightweight and sturdy construction. A distinctive feature is a reversing clutch to permit sweeping in either direction.—*Standard Steel Corp., So. Boyle Ave., Los Angeles 11, Calif.*

20,000 Items—A catalog of 800 pages gives engineering and detailed information on more than 20,000 items used in contracting, industrial and mining operations.—*Colonial Supply Co., 217 Water Street, Pittsburgh 22, Pa.*

Airblast Equipment—A new illustrated catalog describes a complete line of airblast equipment, including cabinets, tanks, suction guns, nozzles and accessories.—*American Foundry Equipment Co., 555 So. Byrkit Street, Mishawaka, Ind.*

Protective Coatings — The application of industrial coatings is described in a 16-page pocket-size booklet of detailed instructions.—*Carbozite Corp., First National Bank Bldg., Pittsburgh 22, Pa.*

Blowers, Fans, and Compressors—A series of three bulletins illustrates and tells about axial flow fans, centrifugal blowers, and vent sets for general ventilating and air conditioning service.—*Buffalo Forge Co., P. O. Box 985, Buffalo 5, N. Y.*

Facing Tile—A new catalogue contains specifications, finishes, colors and shapes of glazed and unglazed facing tile produced by the members of the Facing Tile Institute, composed of the leading manufacturers in the industry.—*The Structural Clay Products Institute, 1756 K Street, N.W., Washington, D. C.*

Cavity Walls—An important and rapidly growing trend in clay products construction especially adapted to low cost housing is told about in an interesting booklet.—*Structural Clay Products Institute, 1756 K St., N. W., Washington, D. C.*

Service Parts—So far as possible, service parts for this manufacturer's vehicles, a bulletin points out, are available to the user during the entire life of the vehicle. How to obtain them is explained in the circular.—*Marmon-Herrington Co. Inc., Indianapolis 7, Ind.*

Washing Plants—The operations in a washing plant include: Feeding, handling, washing, screening, dehydrating, storage, and crushing. How portable and semi-portable plants are operated is explained in a 20-page booklet.—*Pioneer Engineering Works, Inc., 1515 Central Ave., Minneapolis 13, Minn.*

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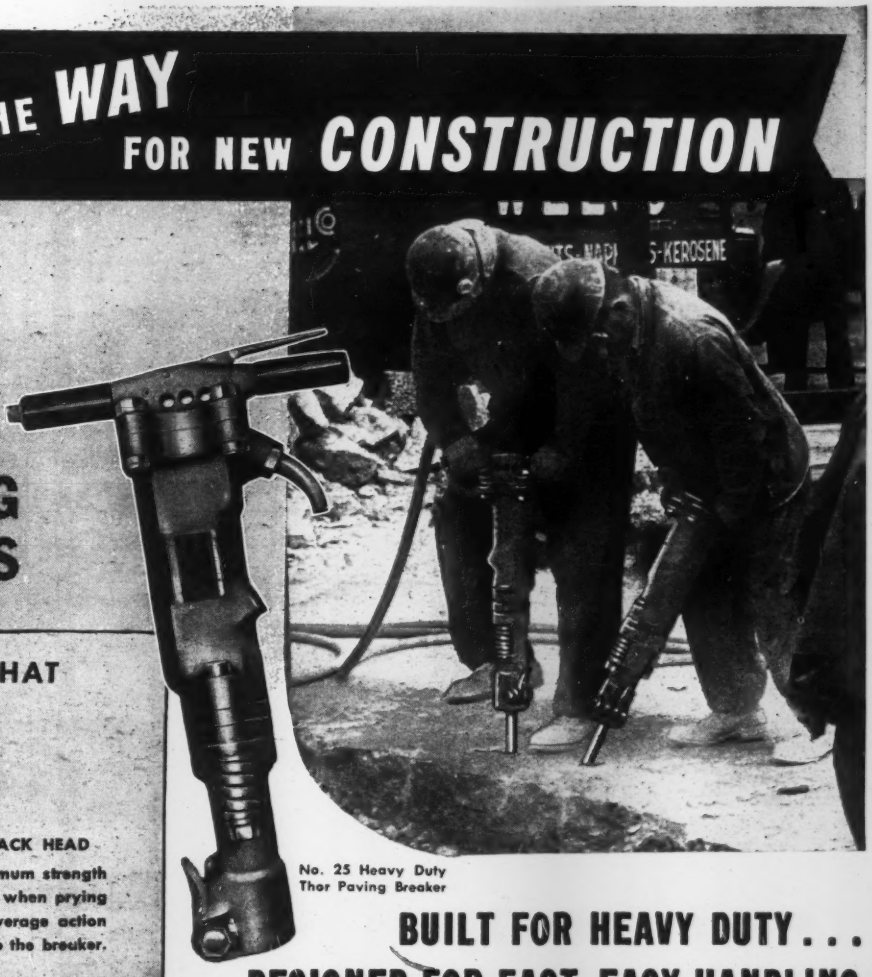
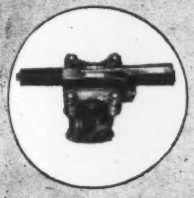
WITH

Thor PAVING BREAKERS



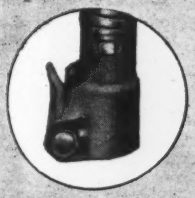
No. 25 Heavy Duty Thor Paving Breaker

THOR FEATURES THAT SPEED UP HEAVY DEMOLITION . . .



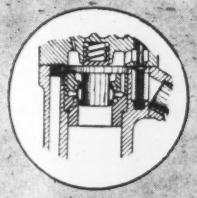
4-BOLT BACK HEAD

Gives maximum strength and rigidity when prying or when leverage action is applied to the breaker.



LATCH-TYPE RETAINER

Simple, efficient. A spring detent holds latch retainer in closed position. Operator has only to press down on retainer with his foot to insert or release tool.



POSITIVE, SHORT-TRAVEL TUBULAR VALVE

This actuates a block-type piston, minimizes vibration and makes machine easier to handle. Also assures reliable performance with low air consumption.

BUILT FOR HEAVY DUTY . . . DESIGNED FOR FAST, EASY HANDLING

Thor Breakers pack the power to make fast work of toughest demolition jobs—pavements, walls, columns, piers, foundations, etc. Operators enjoy the smooth, easy handling of Thor Breakers that is due to improved balance and freedom from unnecessary vibration. Together, these features assure more work in less time with less effort—*at a definite saving in job costs.*

Strength, rigidity and longer life are guaranteed by alloy-steel drop-forged construction . . . Thor Breakers have the extra stamina and capacity to handle the toughest jobs day after day at minimum operating and maintenance costs. "Measured air"—an exclusive Thor feature—provides maximum power for peak efficiency.

For complete information about Thor light, medium and heavy duty paving breakers and other Thor contractors' tools, write for Catalog 42-A.

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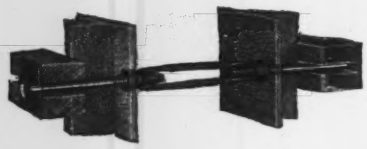
RICHMOND TYSCRU FORM TIE SYSTEM

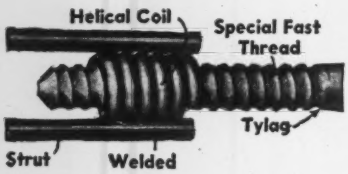
Offers

Simplicity, Planning, Savings

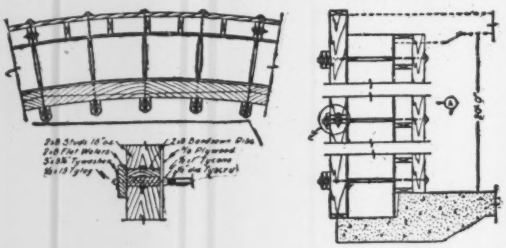
PLANNED FORM WORK BY RICHMOND ALSO SPEEDS CONCRETE CONSTRUCTION



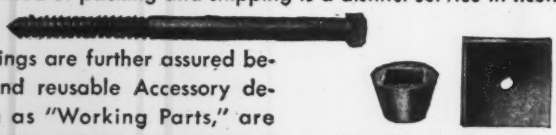
Richmond's Form Tying Devices are based on a simple principle consisting of the use of a Helix coil resistance welded to high strength wire struts to act as a threaded socket for Richmond coarse thread Tylag bolts. In action the high strength wire and Helix coil develop the full strength of the Tylag Bolt which by reason of its simple construction and coarse thread (3½ to 6 lag threads per inch as against 7 to 12 machine threads per inch) can be reused indefinitely with no depreciation.



Simplicity: Coarse thread principle provides for ease of installation, durability of accessory parts for continuous reuse without damage and permits for convenient use of the Tyscru for the many reanchorage requirements incidental to form and scaffold requirements.



Planning: Richmond offers — consultation on best types of forms and ties to be used for a given job; estimates on job requirements and recommendations on specific form problems. All of this is without obligation. Richmond's method of packing and shipping is a distinct service in itself.



Savings: Savings are further assured because Richmond reusable Accessory devices; known as "Working Parts," are furnished RETURNABLE FOR FULL CREDIT —no rentals charged.

Form-Ty Engineering Guide on Request

RICHMOND SCREW ANCHOR COMPANY, INC.

816 LIBERTY AVENUE · BROOKLYN NEW YORK

MANUFACTURING SINCE 1911

BRIEF NEWS

The city council of Houston, Tex. recently voted to charge property owners about 60 percent of the cost of resurfacing permanently paved streets but to seal coat the streets free of charge to property owners.

In that area a pliable asphaltic seal coat ½ to ¾-in. thickness costs 12½ to 30 c. per sq. yd. Resurfacing with 1½ to 2 in. of stronger asphaltic material is done at a cost of 75c. to $1.25 per sq. yd.

Fifty million dollars worth of building projects is in prospect for Toronto, Ont., in the immediate postwar period, according to Building Commissioner K. S. Gillies. New hospital construction tops the list with projects estimated to cost $13,000,000, followed by $10,000,000 each for hotels and schools.

A two-year planning job involving $36,000,000 of highway construction during the first three years following the war was completed recently by Oregon's State Highway Commission engineers. Of the total the federal government would supply about $21,000,000.

A $22,000,000 postwar rural electrification project is planned by the Ontario Hydro Electric Power Commission, according to T. H. Hogg, chairman. The program will be spread over a five-year period. When it is completed only 15 out of every 100 farms in the province will be without electric service. The government will provide for 50 percent of the cost. It is estimated that the work will give 24,513 man-years of work.

Long range proposals for public works totaling $445,000,000 were presented to the Los Angeles County Board of Supervisors recently by County Manager Al Campion. Flood control projects amounting to $271,167,000 represented the bulk of the recommendations. First priority was listed for public buildings, flood control projects, sewers and roads which could be financed through $14,808,436 which will be available in tax funds during the next fiscal year.

Work of re-erecting the Wolf Creek bridge near Bettsville, Ohio, is under way. City Engineer L. C. Roush, in charge of the project, recently received the first 75-ft. steel truss, enabling him to start work on the vitally needed structure which has been out of commission

THEY PICK UP "EGGS" WITH WIRE ROPE

Giant "eggs" for our bombers require frequent handling before they are dropped on the enemy. Juggling heavy bombs is one of the vital everyday tasks which our men must perform . . . and one in which tough, dependable wire rope is important.

Less dramatic, but equally important, is the work which wire rope is doing on the home front. In oil fields, forests, mines, mills and shipyards . . . you'll find men relying on the stout, steel muscles of Wickwire Spencer Wire Rope to do a variety of heavy hoisting and hauling jobs.

With wire rope harder to get, each length must be made to last longer. And, when you need new rope, specify WISSCOLAY *Pre*formed, manufactured by Wickwire Spencer. It lasts longer than the non-preformed; is easier to cut, splice and install; is kink-resistant and safer to handle.

If you have a wire rope problem our wire rope engineers will be happy to help solve it. Just write Wickwire Spencer Steel Company, 500 Fifth Avenue, New York 18, N. Y.

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"Know Your Ropes" contains 82 pages of suggestions on proper selection, application and usage of wire rope. This easy-to-read, profusely illustrated manual can save you money . . . and save wire rope for the war fronts. Send for your free copy now.

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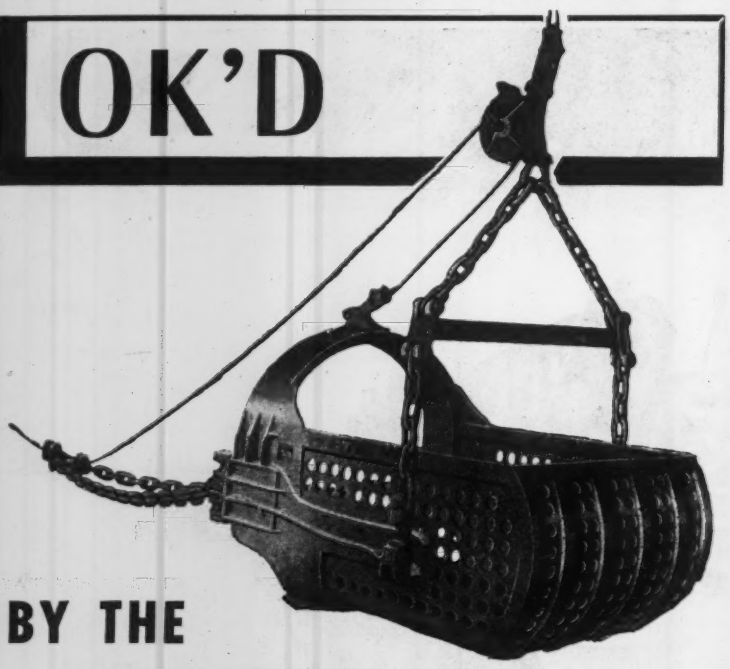

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★ Full Pay Load every trip, even in wet digging.

★ Three Types; light, medium, and heavy duty. With perforations or solid.

HENDRIX *Lightweight* **DRAGLINE BUCKETS**

⅜ to 30 Cubic Yards

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since it was destroyed by a cyclone in 1943.

Elimination of swing and graveyard shifts at the Kaiser Co., Inc., Swan Island shipyards in Oregon, and consolidation of workers into one shift has taken effect as the first major cut-back in the Portland area's shipbuilding program. The yard, which builds tankers for the Navy, will employ 10,500 on the day shift and will operate nine hours a day, six days a week. A contract for six vessels was cancelled recently, and further cancellations are probable, according to Edgar F. Kaiser, general manager.

When Mexico's present hospital construction program is finished, there will be hospitalization for hundreds of persons in remote regions who never had it before. Under construction are 30 hospitals throughout the country, and a $30,000,000 medical center in Mexico City. While most of the work will be in Mexico City, every state will benefit eventually.

The federal health and public welfare department, which obtains much of its revenue from national lottery receipts, is paying half the cost of the new hospitals, and state or territorial governments the other half.

Postwar needs of Ashtabula, Ohio, include modernization of the sewerage system, a new municipal airport, development of a small-craft harbor, and the prevention of erosion along the Lake Erie shore, as well as paving of additional streets, says Jay H. Shaw, city auditor.

Francis H. Carroll, Monroe County, N. Y., director of public works, is preparing to put county roads in good condition with an appropriation of $250,000 voted by the board of supervisors for that purpose. The county has 587 miles of roads.

President Manuel Avila Camacho of

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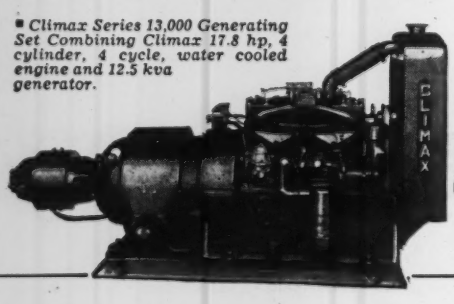

CLIMAX SERIES 13,000 Generating Sets

THE DEPENDABLE, smooth, power output and steady, flickerless lighting supplied by these compact, quiet-running units makes them invaluable for railroad, construction and oil field flood lighting — for standby power and light in industrial plants, hospitals, schools, etc.— and for operating medium size radio transmitters and electric magnets.

21 Models, 5 to 12.5 kva AC, and 6 to 10 kw DC, available with hand crank, remote control or automatic emergency transfer starting. Equipped for stationary or portable service. Operates on gasoline, natural gas, butane or other fuels. Average fuel consumption at full load, .20 gals. per kwh—on 1000 BTU natural gas, 25 cu. ft. per kwh.

For bulletin describing all available models, write Climax Engineering Company, Clinton, Iowa. Other Climax Generating Sets from 300 watts to 312 kva.

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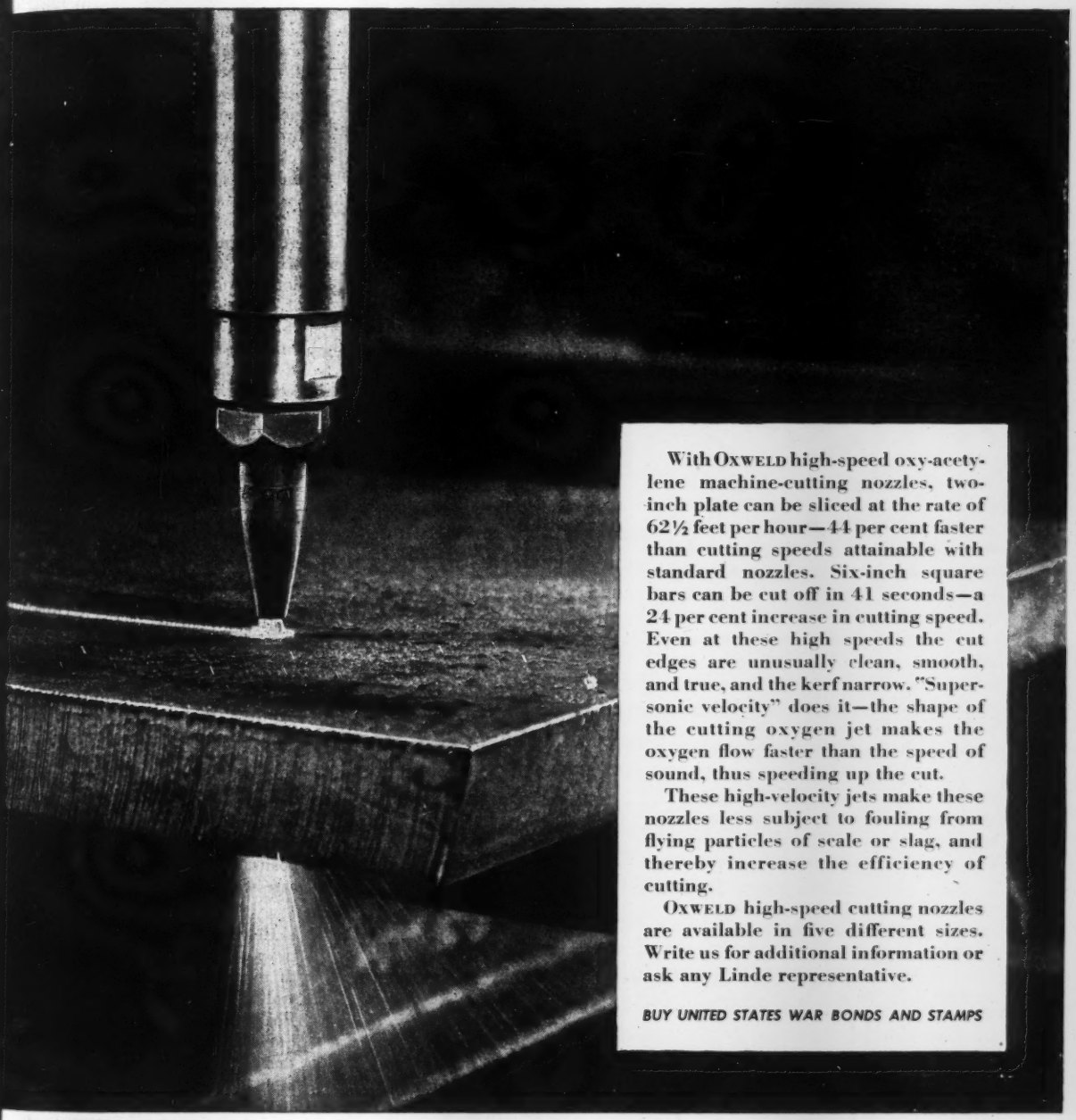
Builders of Climax BLUE STREAK and DIESEL ENGINES
CLIMAX ENGINEERING COMPANY

OXWELD HIGH-SPEED NOZZLES CUT STEEL UP TO 44 PER CENT FASTER THAN STANDARD CUTTING NOZZLES



With OXWELD high-speed oxy-acetylene machine-cutting nozzles, two-inch plate can be sliced at the rate of 62½ feet per hour—44 per cent faster than cutting speeds attainable with standard nozzles. Six-inch square bars can be cut off in 41 seconds—a 24 per cent increase in cutting speed. Even at these high speeds the cut edges are unusually clean, smooth, and true, and the kerf narrow. "Supersonic velocity" does it—the shape of the cutting oxygen jet makes the oxygen flow faster than the speed of sound, thus speeding up the cut.

These high-velocity jets make these nozzles less subject to fouling from flying particles of scale or slag, and thereby increase the efficiency of cutting.

OXWELD high-speed cutting nozzles are available in five different sizes. Write us for additional information or ask any Linde representative.

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When a Twin Disc Hydraulic Coupling is applied to equipment requiring the rapid acceleration of heavy loads, the load is brought up to speed easier. The power is applied to maximum advantage . . . smooth and rapid acceleration is obtained . . . the danger of stalling is eliminated.

You will find that a Hydraulic Coupling gives you other important benefits, too. It is fabricated from steel sheets, formed and welded into solid units. This construction assures greater strength than the conventional casting . . . reduces weight by 30% . . . provides shorter axial length, thereby cutting space requirements. These and many other advantages of Twin Disc Hydraulic Couplings are fully described in a special engineering bulletin —No. 136. Why not send for it today? TWIN DISC CLUTCH COMPANY, Racine, Wisconsin (Hydraulic Division, Rockford, Illinois).

Mexico has approved a budget of $ 000,000 for development and impro ments on the Inter-American Highw through Mexico. The government h also set aside $5,000,000 for finishi the Southeast Railway to connect t Yucatan Peninsula with the rest of t country.

A promise that approximately 8,3 000 acres of federally-withdrawn la along the Alaska Highway would made available to the public for t development of its minerals, timber a other resources when military requ ments would permit, has been fulfill by Secretary of the Interior Harold Ickes by approving an order reduci the size of the government reservati on each side of the road.

Effecting the restoration to public u of about 6,250,000 acres of the fede domain, the order reduces withdraw of land previously made at the requ of the War Department for the site the road, from 20 to 5 miles on each si of the highway. So the withdrawal reduced to a strip 10 miles wide, 5 mi on either side of the right-of-way fr Big Delta to the Alaska-Yukon Bou ary, and from its junction with t Richardson Highway, near Gulkana, the Tanana River.

It is expected that the new 10-m strip will be further narrowed soon a that, eventually, an additional 2,080,0 acres of land will be restored, th entirely lifting the restrictions plac for road construction purposes up 8,330,000 acres of public land in t territory.

Flint, Mich., it is reported, is cepting deposits for property own for postwar street construction, taki the step after petition by 51 percent the affected property owners. Under t plan, 50 percent of the total cost construction must be covered by posits, the balance to be met by spec assessments later.

Hearings have been held recently proposed legislation in Massachuse to put petroleum pipelines under c trol of the Public Utilities Commissi Philip G. Bowker, associate metropo tan district commissioner, suggest that a special division of the depa ment should be set up to control su projects. Representatives of oil co panies claim that such control wou place private business in the same ca gory as public utilities.

Prospects are brighter for more p duction this year of highway main nance machinery, Louis Levenson of t War Production Board declared cently in addressing a conference of

Facts About Air-Entraining Portland Cement for Concrete Pavements

CONCRETE INFORMATION
HIGHWAY AND MUNICIPAL BUREAU
PORTLAND CEMENT ASSOCIATION
No. HB 18
THE ELIMINATION OF PAVEMENT SCALING
BY USE OF AIR-ENTRAINING PORTLAND CEMENT
No. HB 1
PROTECTION OF EXISTING CONCRETE PAVEMENTS
FROM SALT AND CALCIUM CHLORIDE
No. HB 3
CONSTRUCTION OF CONCRETE PAVEMENT IN COLD WEATHER

Technical research in laboratory and field has proved that concrete pavements built with air-entraining portland cement are highly resistant to severe frost action and scaling caused by use of sodium or calcium chlorides for ice removal.

Improved methods of protecting existing concrete pavements from such scaling are now available.

Advances have also been made in methods of placing concrete pavements in cold weather.

SCALE-RESISTANT CONCRETE PAVEMENTS

Four-page illustrated information sheet describes construction procedure using air-entraining portland cement to build pavements which resist severe frost action and scaling due to use of sodium or calcium chlorides for ice removal.

PROTECTION FOR EXISTING PAVEMENTS

Tested, economical methods of applying protective coatings to existing concrete pavements to prevent scaling from the above causes are described and pictured in a four-page information sheet.

PAVING IN COLD WEATHER

Eight-page illustrated information sheet gives specifications and describes latest methods of placing concrete pavements for roads, streets and airports during winter weather.

● Any one or all three of these information sheets are available on request —free in the United States and Canada.

PORTLAND CEMENT ASSOCIATION, Dept. A6b-17, 33 W. Grand Ave., Chicago 10, Ill.

A national organization to improve and extend the uses of concrete . . . through scientific research and engineering field work

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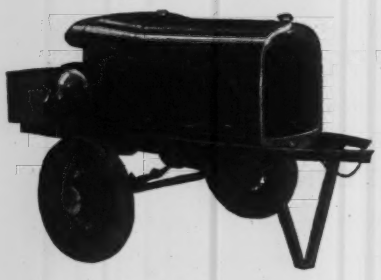
- says Kenneth A. Arnold
Arnold & Carman, Washington C. H., Ohio



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gineers and maintenance superintendents of highway departments of 13 eastern states in Philadelphia, Pa. Mr. Levenson, chief of maintenance machinery, Office of Civilian Requirements, suggested to the highway executives that they make careful inventories to determine machinery needed most.

The city council of Dallas, Tex., has authorized Thomas D. Broad to prepare plans to triple the size of the Love Field administration building at a cost of $650,000. The council also authorized Rollins & Forrest to prepare plans and specifications for all improvements, exclusive of buildings, at Redbird Airport, to cost about $1,000,000.

Immediate preparation of plans for construction of two 3,000-ft. long by 150-ft. wide concrete runways for the Redbird Airport at Dallas, has been ordered by V. R. Smitham, acting city manager. The airport will be used mainly for non-scheduled and private flying activities.

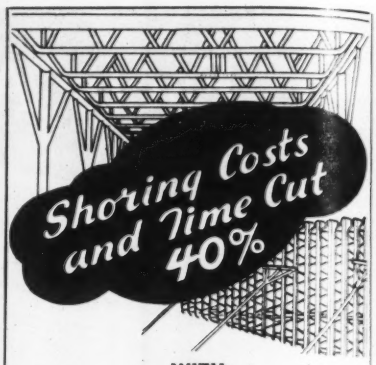
Wisconsin can begin approximately $16,548,000 worth of construction work on some 330 miles of state trunk highways as soon as labor, material and equipment are available, according to a report sent to the War Production Board by the State Highway Commission.

Surveys also are being made for 1,192 miles of state trunk highway work at an estimated cost of $71,358,000 including improvements and extensions. There are 871 miles of construction to cost $40,000,000 programmed and wholly or partially financed, although detailed construction plans are not yet ready.

Plans also are being made for another 300 miles of state trunk highways involving a probable expenditure of $30,000,000. The commission has about $6,000,000 worth of federal aid in frozen funds.

Construction of a modern highway for the entire length of Vancouver Island is one of the primary items on the postwar construction program of British Columbia, it is revealed by Herbert Anscomb, Minister of Public Works. Necessary surveys and acquisition of property required are already under way to be ready to proceed with construction when possible.

A model village in Walker County, Ala., for employes of the Alabama Power Co.'s Gorgas coal mine will be constructed by the company at a cost of $500,000, Thomas W. Martin, the power company president has announced. The houses will have modern conveniences and each will occupy an acre plot. The company will sell the homes to employes on easy terms.



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BUCKET LIPS
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EXTENSION BLADES, and SCARIFIER TEETH

50 years experience and special steels forged at the edges assure that extra wearing quality you need.

All widths, lengths, and thicknesses; *punched ready to fit your machines.*

Write for special Bulletins—give type and name of machines you operate.

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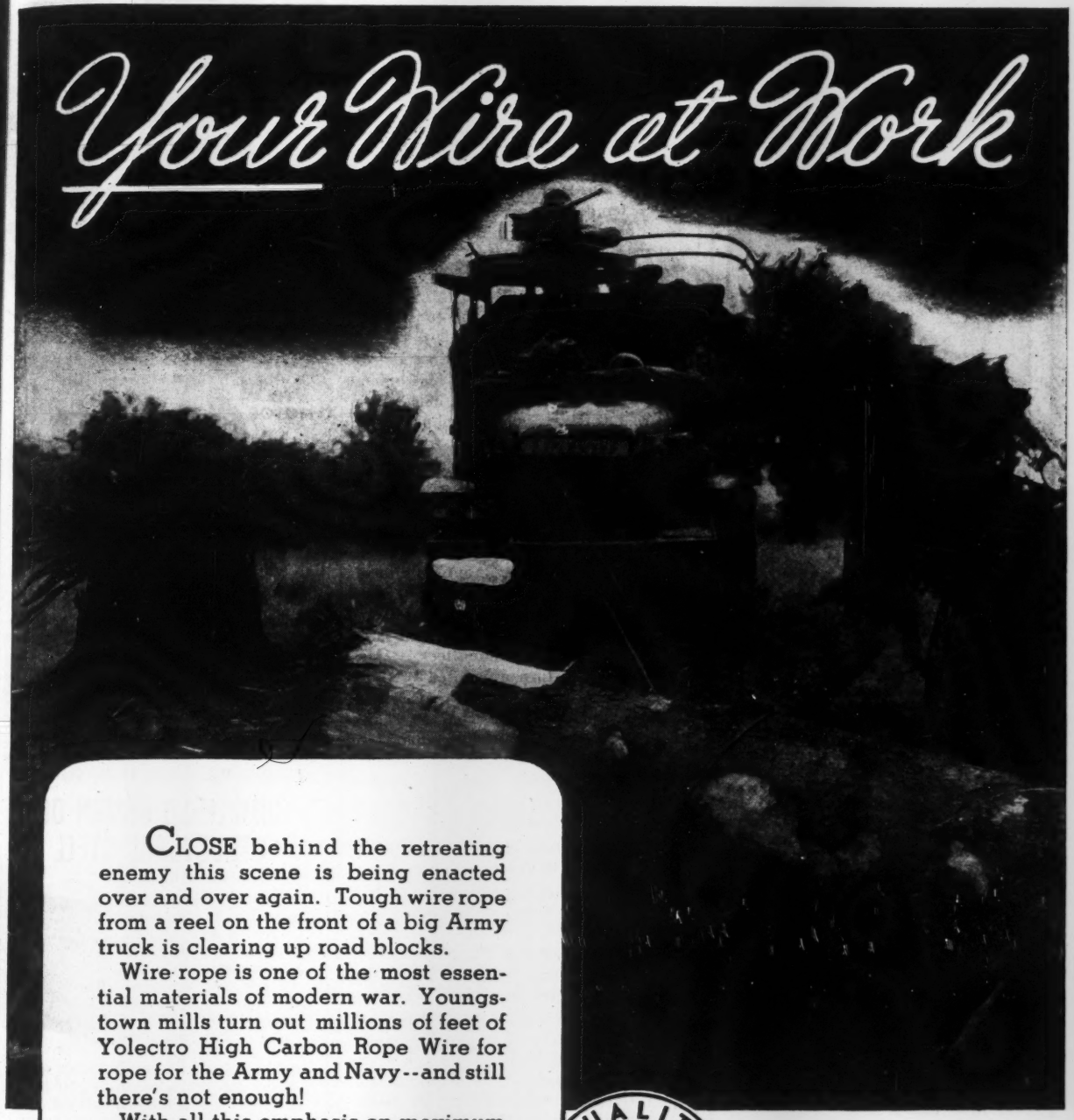
Your Wire at Work



CLOSE behind the retreating enemy this scene is being enacted over and over again. Tough wire rope from a reel on the front of a big Army truck is clearing up road blocks.

Wire rope is one of the most essential materials of modern war. Youngstown mills turn out millions of feet of Yolectro High Carbon Rope Wire for rope for the Army and Navy--and still there's not enough!

With all this emphasis on maximum volume production, quality is none-the-less jealously guarded. The high standards that have given Youngstown wire its enviable reputation are rigidly maintained. Thus we can meet your specifications, either standard or special as to physical tolerances and chemical and metallurgical characteristics. Consequently, we'll be glad to talk to you right now about wire to meet your most exacting requirements.

QUALITY TRADE MARK YOUNGSTOWN SERVICE

Army Engineers remove a tree from the road, to speed up the advance of American doughboys and wheeled equipment. Official U. S. Signal Corps photo.

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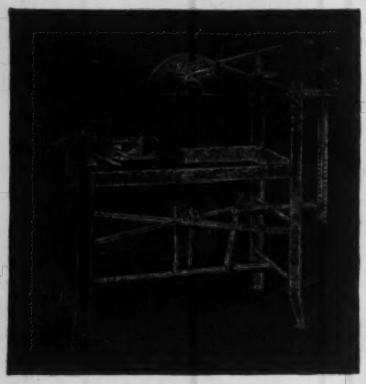
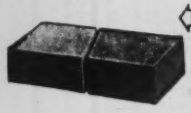
...with
Clipper Masonry Saws

Your Special Size and Shape Brick or Tile can now be "Tailor-Made" at a moment's notice!



The new Clipper Multiple Cutting Principle makes possible faster cutting of every masonry material regardless of hardness.

Here are a few typical examples of the speed and accuracy with which fire brick can be cut for furnace repairs.



This acid brick intended for a chemical plant acid chamber was cut completely in two, in 37 sec.

One of many intricate cuts performed on first quality clay brick for heat treating furnaces. Made in 8 seconds.

Silica brick cut lengthwise for open hearth furnace work, only 9 seconds were required to complete this cut!

Basic refractories for steel furnaces or cement kilns must be accurately installed. This magnesite brick was cut in 12 seconds!

Clipper Saws are available for trial. Write for Descriptive Catalogs.

THE Clipper MANUFACTURING COMPANY

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MEN AND JOBS

O. H. Jeffers, with the division of surface water of the U. S. Geological Survey since 1934, is now working in the Washington, D. C., office of the survey on a temporary assignment. He is assisting in reviewing and editing stream-flow records to be included in the report "Surface Water Supplies of the United States." When this work is completed, he will return to Chattanooga, Tenn., to reassume his duties as office engineer under the direction of **F. M. Bell,** district engineer. Mr. Jeffers has been in the Chattanooga office since 1940. For the six years previous to that he worked in the St. Paul district office.

Edwin A. Schmitt, head engineer of the Washington, D. C., district of the U. S. Army Engineers, has been named chairman of a newly formed technical committee of the Interstate Commission on the Potomac River Basin. The new committee is a consolidation of the commission's former planning and sanitary engineering committees. Mr. Schmitt has in turn appointed **I. Alvin Pawarew,** director of the Maryland State Planning Commission, as chairman of the sub-committee on planning, and **Ralph E. Fuhrman,** superintendent, District of Columbia sewage treatment plant, as chairman of the sub-committee on sanitary engineering.

Milton F. Denault is now doing topographic mapping and making other types of surveys on the Rio Doce with headquarters at Gouvernador Valadares, Brazil. From July, 1937, to November, 1940, Mr. Denault worked with the Geological Survey in various positions, including party chief on plane-table topographic surveys. In November, 1940, he joined W. M. Brown, Inc., to serve first as topographic field engineer on various surveys and later as assistant on all topographic work for the company. This latter assignment included work in connection with Army and Navy cantonments and involved modern methods of photogammetry in application of aerial photographs. Later Mr. Denault returned to the Geological Survey to work at Washington, D. C., and has gone to South America under the auspices of the survey.

Maj. Alfred E. Williamson, member of the Sanitary Corps of the U. S. Army, is now chief engineer of a field party in Bolivia for the division of health and sanitation of the Office of Inter-American Affairs. Major Williamson began these new duties a few weeks ago when

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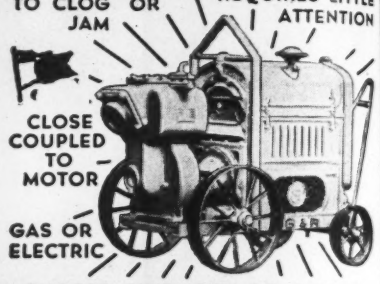

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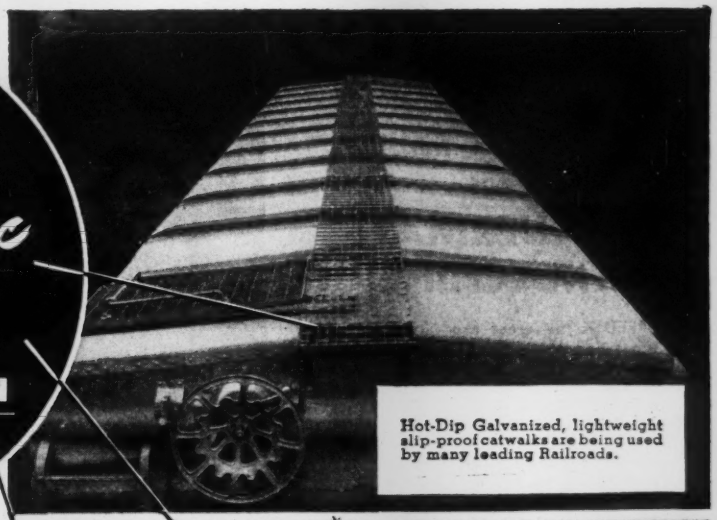

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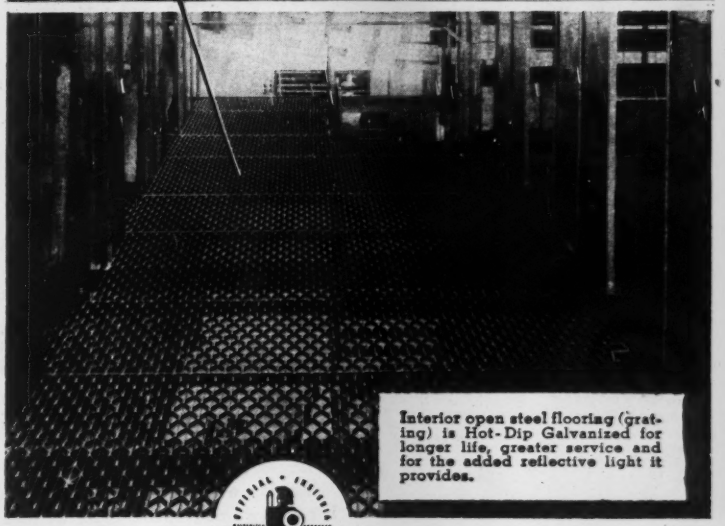

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Lt. Col. George C. Bergman, formerly chief engineer, was reassigned by the Sanitary Corps. Major Williamson holds a bachelor of science degree from the University of Maryland and a master of science degree in sanitary engineering from the University of North Carolina. He also received training as a special student in water and sewage at George Washington University and in public health engineering at the University of North Carolina. Major Williamson's experience before going to Bolivia included four years with the War Department as filtration plant operator at Fort Meade, Md.; about three years as county sanitary engineer with the Georgia State Health Department; one year as research assistant, University of North Carolina, and about two years as associate and chief sanitary engineer, Florida State Board of Health. In 1942 Major Williamson was commissioned first lieutenant in the Sanitary Corps and was attached to the health and sanitation division of the Office of Inter-American Affairs in December of that year. He worked a year with a field party in La Paz, Bolivia, before his present assignment.

Lt. Col. Edward S. Hopkins, Sn. C., on duty as chief, Sanitary Engineering Section, Surgeon's Office, Third Service Command, has been promoted from major. Colonel Hopkins is on military leave from his civilian position of filtration engineer, Bureau of Water Supply, Baltimore, Md.

A. A. Keever, formerly division engineer of the New York Central System at Mattoon, Ill., has been promoted to division engineer at Cleveland. **C. V. Talley** has been advanced from supervisor of track at Galion, Ohio to division engineer at Matoon. Included among the other New York Central promotions is the advancement of **E. J. Bayer** from assistant district engineer at Cincinnati to principal assistant engineer with headquarters in that city. **L. B. Elliott** advances from division engineer at Cleveland to assistant district engineer at Cincinnati, and **C. C. Wehrle** moves from supervisor of track at Galion to the same position at Cleveland. **M. M. Bodenmiller** and **S. L. Furry,** formerly assistant supervisors of track at Galion have each been promoted to supervisor of track with headquarters in that city.

Lt. Warren E. Campbell, formerly of Winchester, Ill., has been awarded the Distinguished Flying Cross for outstanding achievement as navigator on a B-24. He also wears the Air Medal and two Oak Leaf Clusters. Before entering

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WHEREVER YOU find a job of tough, heavy hauling going along fast and easy, you'll usually find a Mack. The reason? Simple. Mack trucks are built to be the *best* in the world. Performances *prove* the success of that aim!

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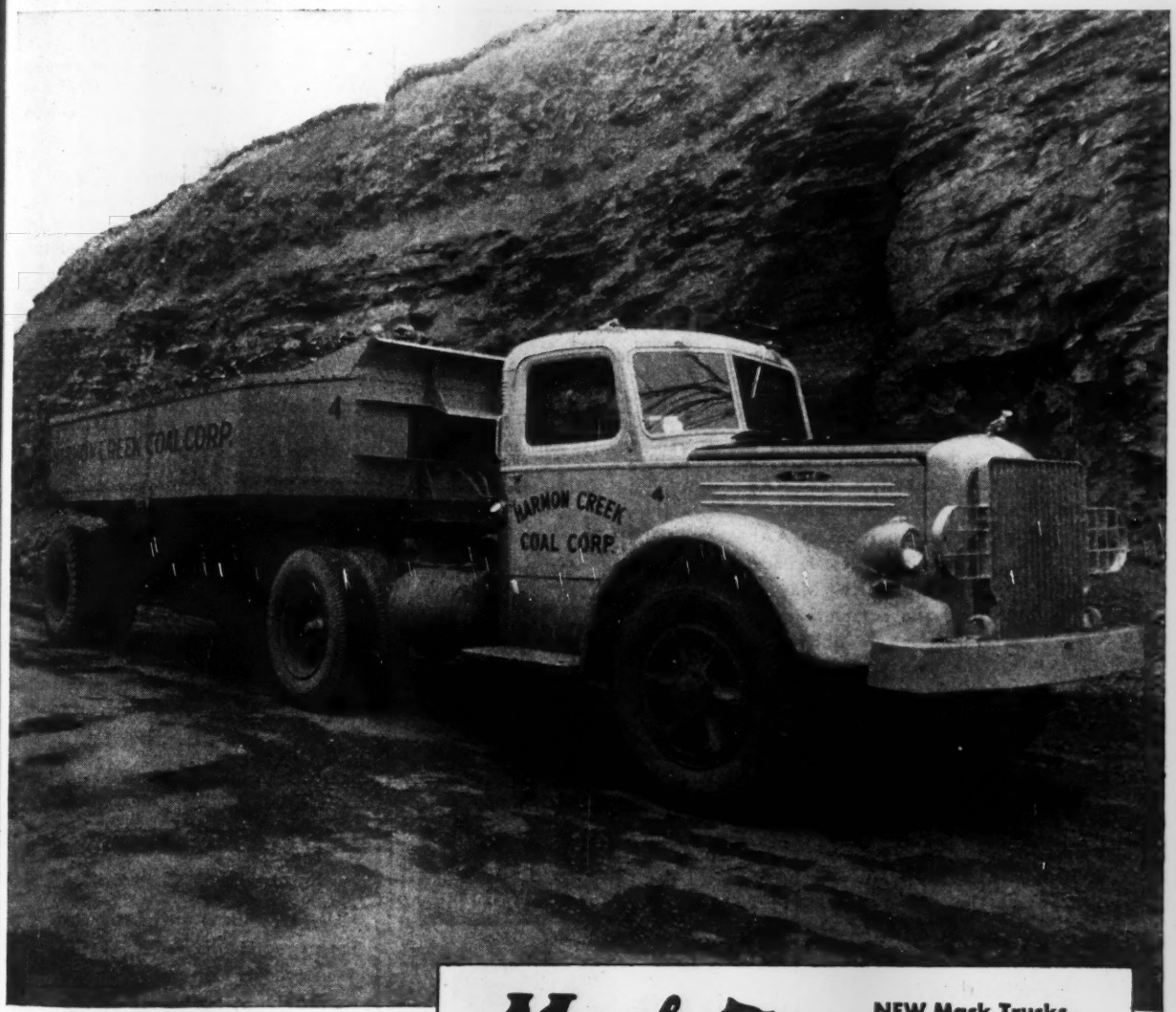

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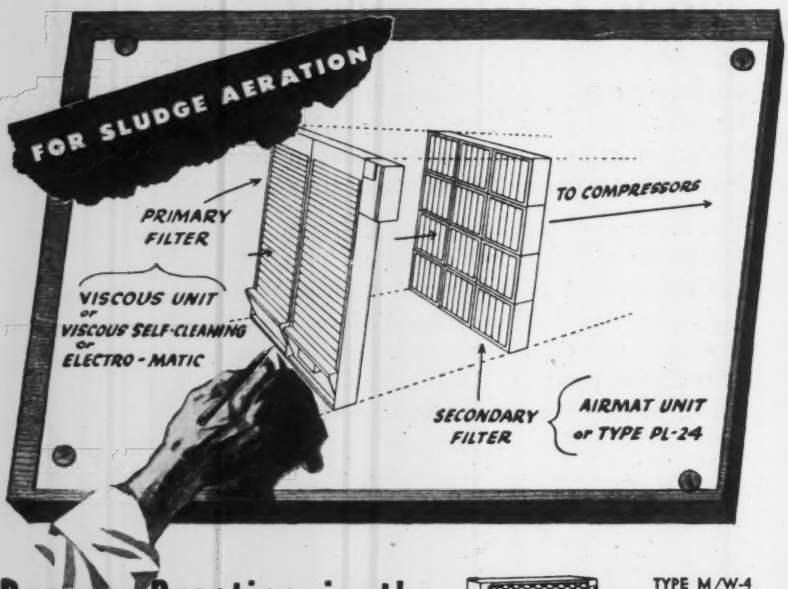

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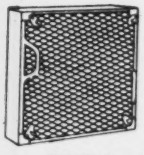

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Primary filter for smaller installations. May be assembled in batteries for any dust concentration. High in efficiency; large dust holding capacity.

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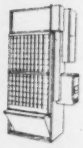
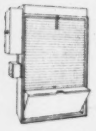
Offers highest cleaning efficiency, collecting dust by electrical precipitation. Automatic; self cleaning. Used as primary filter.





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service in June, 1942, Lt. Campbell was an engineer in the Illinois Division of Highways. He is a graduate of the University of Illinois college of engineering.

Neil Berg of Vancoover, Wash., has been appointed Washington state flood control engineer, succeeding Lars Langloe, who resigned. Mr. Berg was supervisor of reclamation in Idaho before going with Kaiser Vancouver shipyards.

Lewis S. Shepard, employed by the Minnesota State Highway Department for a number of years, has been appointed county highway engineer of Houston County at Caledonia, Minn. He succeeds **Edward M. Paulson,** who was recently named county engineer of Goodhue County at Red Wing.

W. Harper Hoover has been promoted to senior draftsman in the division of engineering and construction, Toledo, Ohio.

Addison C. Murphy, Barnesville, Ohio, has been named resident state highway maintenance engineer for Jefferson, Harrison, and Belmont counties, with headquarters in Steubenville.

C. R. Wilcox, formerly for two years city engineer of Lafayette, Ind., has become manager of the Mountain-Pacific chapter of the Associated General Contractors at Seattle, Wash. He was graduated from Purdue University as a civil engineer.

E. I. Wood, Jr., Who prior to entering the Army in December 1942, was supervisor of the engineering department of the state WPA office at Raleigh, N. C., has been promoted to first lieutenant in the Army Corps of Engineers in the South Pacific.

Maj. Robert Lee DuBose of Atlanta, Ga., is post engineer at the Laurinburg-Maxton Army Air Base at Maxton, N. C.

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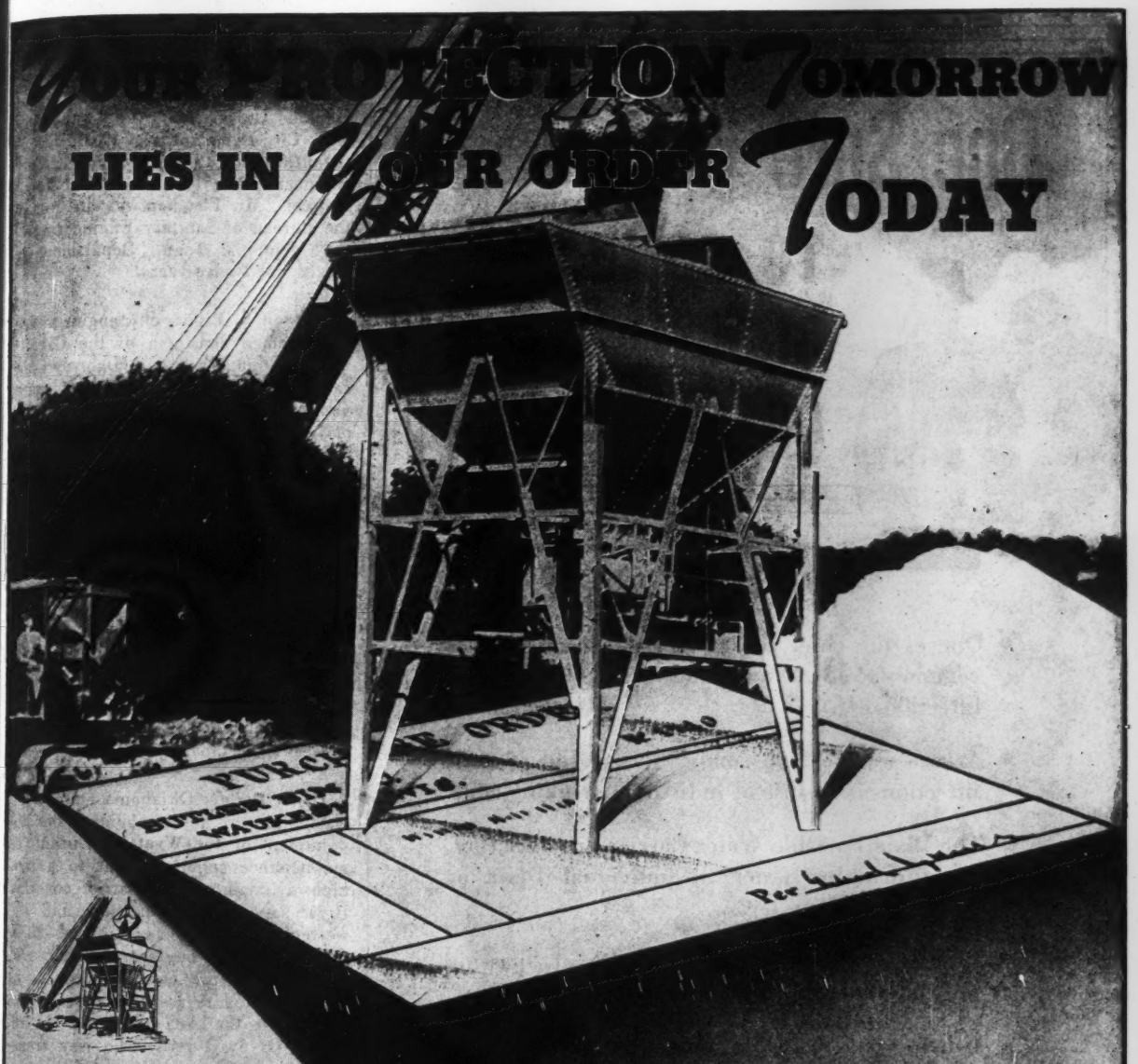

Stop and analyze now, [illegible] future equipment requirements [illegible] in the light of two imperative [illegible]. First, — highway reconstruction alone [illegible] to say nothing of the vast new highway programs, involve an equipment demand that will require as much effort on the part of manufacturers as ever did the demands of war. Second, — time schedules, competition and the magnitude of the task will require equipment engineered to the utmost in capacities and production.

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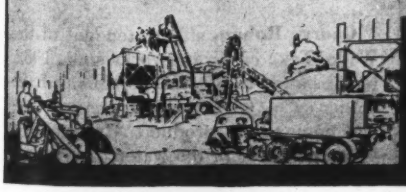

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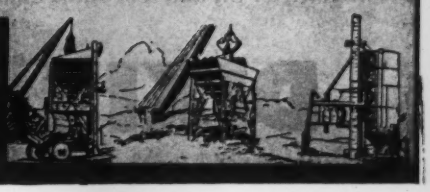

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- One of the chief causes of sick absenteeism is common colds, "flu" and such mouth-borne infections.
- A sure way to help combat the spread of such infections is the use of individual drinking cups.
- The Dixie Portable Water Carrier provides cool, clean drinking water in individual Dixie or Vortex Cups.
- Its use on the job lessens the risk of "passing on" mouth-borne disease germs.
- It helps reduce sick absenteeism.
- It cuts out trips to the water wagon.
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- It can help you step up schedules — beat contract dead-lines.

Write for descriptive folder giving complete information on this portable water service, including tanks, dispensers and cups. Dixie and Vortex Cups are made at Easton, Pa., Chicago, Ill., Darlington, S. C., and Toronto, Canada.

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DRINKING CUPS AND FOOD CONTAINERS

Alfred H. Fletcher, for the past four years associate in the department of sanitary engineering, School of Hygiene and Public Health, The Johns Hopkins University, will join the New York City Department of Health as assistant to Sol Pincus, senior sanitary engineer. Prior to his work at Johns Hopkins, Mr. Fletcher was director of the Bureau of Sanitary Engineering in the Memphis, Tenn., Department of Health for twelve years.

Clayton L. Piper, city engineer, has been named chairman of the Greater Toledo, Ohio, Street and Highway Committee, which will coordinate state, county and city express highway and major street plans for Toledo and Lucas County.

Earl F. Tucker, safety engineer on the Boulder Canyon Project of the U. S. Bureau of Reclamation, has been given an award of excellence and $250 for suggesting that safety features be incorporated in the drafting stage of structural designs to prevent accident hazards being built into construction. Mr. Tucker (a graduate of Cornell University's School of Engineering) has been associated with the Boulder Dam project since 1935.

H. E. Bailey, Oklahoma state highway engineer, has announced the appointment of **Joe Wyatt** of Durant, as maintenance superintendent in a new highway maintenance district covering Bryan and Atoka counties, and the western half of Choctaw County. **E. J. O'Dell,** resident engineer in charge of the work in the Denison Dam area, was promoted to assistant division engineer for the Ada district. He replaces **O. A. Burrus,** who was transferred to resident engineer in the construction department. **Alex Schlegel,** assistant engineer at Perry was advanced to assistant state maintenance engineer, and **Veldo H. Brewer,** resident engineer, was promoted to assistant division engineer at Perry.

Maj. Matthews S. Tardy, Birmingham, Ala., has been appointed post engineer for Camp Croft, N. C. He served with the Corps of Engineers overseas in World War 1, and was recalled to the service in 1942, and has previously been located at Ft. Mc Clellan, Ala., and Ft. Bragg, S. C.

George Rohan, superintendent of the Waco, Tex., city waterworks since 1932, has resigned to become president of the Rohen Co., distributing construction and engineering products. **Hubert Davis,** an engineer in the water department for 15 years, is acting superintendent

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FOR UNDERGROUND MAINS
under normal conditions

Long Life: In evaluating bids, the useful life of cast iron pipe is figured at 100 years minimum.

Carrying Capacity: The carrying capacity of standard tar-coated cast iron pipe remains practically unimpaired for centuries. For the certain areas where tuberculating water is encountered, cement-lined cast iron pipe is available. Under such conditions, no other material offers the combined long life and sustained carrying capacity of cement-lined cast iron pipe.

Tight Joints: For *ordinary* pressures, cast iron bell-and-spigot pipe—for *high* pressures, cast iron mechanical joint pipe—are known to be leak-proof.

Tensile Strength: When tested under hydrostatic pressure to destruction, the ultimate tensile strength of cast iron pipe is a minimum of 11,000 p.s.i. for pit cast pipe and a minimum of 18,000 p.s.i. for cast iron pipe made by other methods.

Beam Strength: Under beam stress tests, 10 ft. span, standard 6" cast iron pipe sustains a load of 15,000 pounds and bends approximately one inch before breaking.

Toughness: Under hydrostatic pressure and the impact of a 50 lb. hammer, standard 6" cast iron pipe does not crack until the hammer is dropped four feet.

Internal Pressure: An average of many internal hydrostatic pressure tests on standard 6" cast iron pipe shows this pipe withstands more than 2500 pounds pressure per square inch.

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Imperviousness: The walls of cast iron pipe are impervious to leakage, seepage, or sweating of water, gas or chemicals under internal pressure tests.

Tapping: Cast iron pipe can be tapped cleanly with strong, tough threads, losing little in structural strength.

Other pipe materials meet some of these requirements but only cast iron pipe meets them all.

Whether a pipe material is able to fulfill these requirements is a matter of experience rather than prediction. A page of history is worth a volume of sales claims. History proves that cast iron pipe has been meeting these ten requirements for generations.

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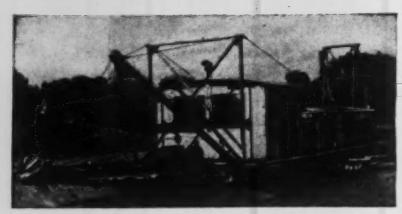

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Florence Crutchfield, Durham, N. C., is now doing drafting work with the city planning department, the first woman to hold such a post in that city. She formerly was connected with the Triangle Construction Co., in the construction of Camp Butner, and with the Post Engineer's Office there. She was one of the first women students in the Duke University School of Engineering.

Among those who have recently received the War Department's Exceptional Civilian Service Award are:

Harry B. Zackrison, Chief of the Materials and Specifications Section, Military Construction Branch, Office of the Chief of Engineers—for a conservation program for the Corps of Engineers.

Leon H. Zach, Chief, Site Planning Section, Engineering and Development Division, Office of the Chief of Engineers—for planning layouts of posts, camps and stations.

Otto F. Sieder, Chief of the Munitions Plants Branch, the Construction Division, Office of the Chief of Engineers—for directing design engineering and construction of munitions plants, depots and experimental facilities for the Chemical Warfare Service and the Ordnance Department.

Thomas A. Middebrooks, civil engineer, Engineering and Development Division, Office of the Chief of Engineers—for the establishment, development and practical application of soil mechanics in the Engineer Department.

Cora L. Camp, Chief, Railroad and Storage Unit, Engineering and Development Division, Office of the Chief of Engineers—for perfecting standards for railway construction, particularly in connection with railroad yards and Army Service Forces Supply Depots.

Herman F. Rook, Great Lakes division of the Army Engineers—for his work in the supervision and maintenance of the MacArthur lock at Sault Ste. Marie, Mich.

B. H. Platt, superintendent of building and grounds at Iowa State College, Ames, Ia., has been named business manager of the institution, which has a $16 million plant. Following his graduation from Iowa State, Mr. Platt was with a firm of consulting engineers in Chicago. He was city engineer of Wilmette, Ill., for three years and city manager for two years.

J. Lloyd Barron, C. E., director of the Division of Sanitation of the Nassau County, N. Y., Department of Health since 1938, has resigned to become sanitary engineer of the National Biscuit Co., New York. His new work includes sanitary supervision of milling and manufacturing plants of the company throughout the United States.

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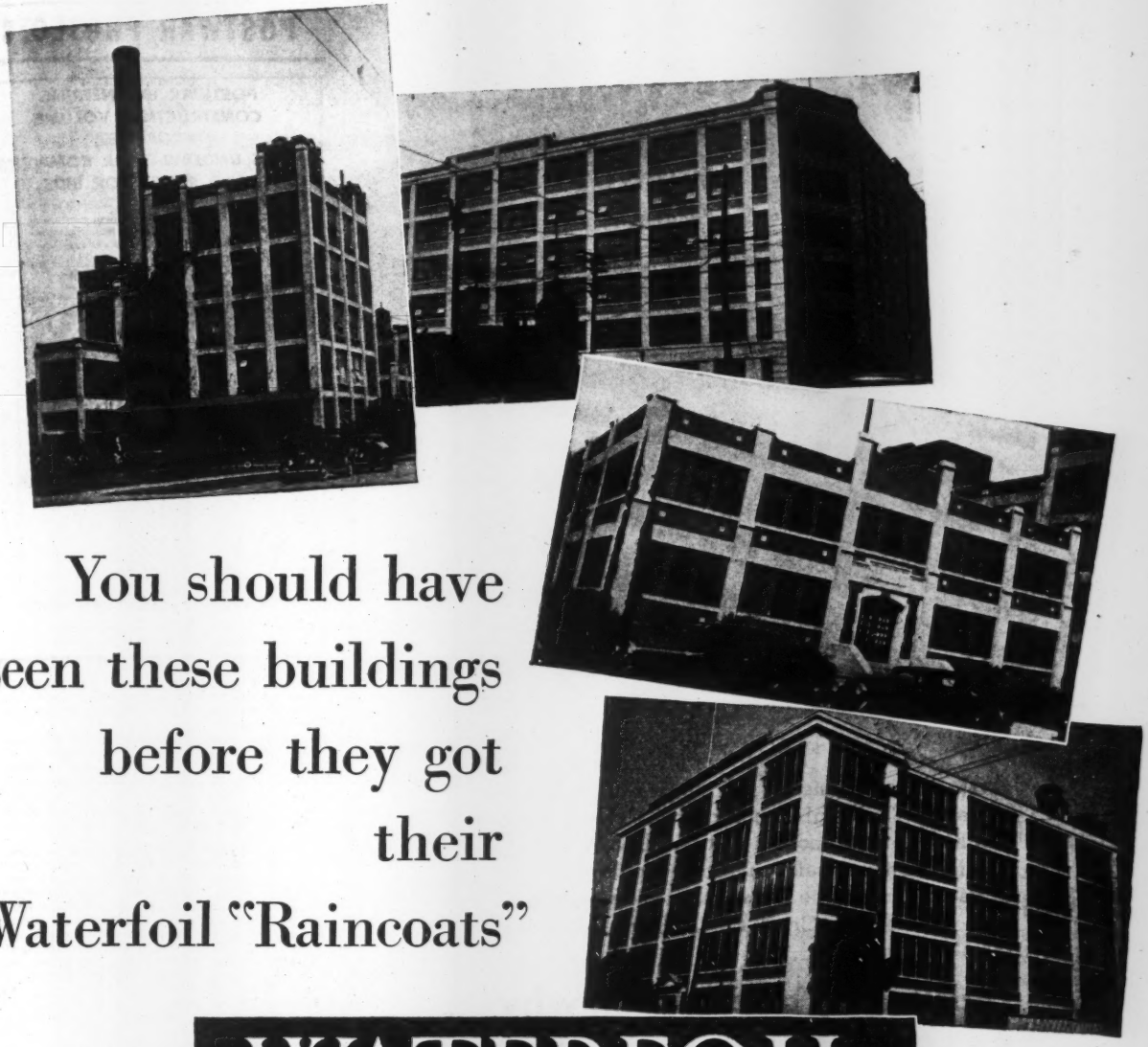

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Yes, they were pretty shabby structures—not much credit to the owners or to the community. If your building exteriors need restoration now, make them look like new and protect them for the future with Waterfoil—a product of the Horn Research Laboratories. Manufactured of irreversible inorganic gels, Waterfoil bonds both physically and chemically to masonry forming a dense hard coating. Easy to apply, Waterfoil lets the masonry breathe as it should but helps to impede water penetration. Free from oil, cement, lime, casein or glue. Send for the Waterfoil literature today.

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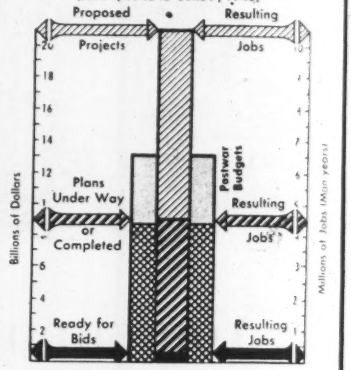
POSTWAR PROJECTS

POSTWAR ENGINEERING CONSTRUCTION VOLUME PROPOSED, PLANS UNDERWAY OR COMPLETED, AND READY FOR BIDS

Status of postwar planning reported to ENR compared with annual postwar construction budget based on assumed National Income of $150,000,000,000 per year.
(Jan. 1, 1943 to June 7, 1945)



(Assuming that $1 of construction volume produces 1 man-hour of labor, ½ on site)

Projects proposed for postwar construction have been published in these columns since January 1943, as they have been reported to Engineering News-Record.

Statistics based on these reports are used by the Committee on Postwar Construction of the American Society of Civil Engineers to measure the progress of plans for postwar projects.

The chart above shows, both in estimated dollar volume and in jobs or man-years of labor, how fast this reservoir of future work is filling up.

If you or your community are working on projects that have not yet been included in this "postwar reservoir," please send us an itemized list and description of them, including estimated cost and the names of the engineers who are at work on the plans. Then as you watch the arrows climb you will know that you and your community are contributing to the success of the NUMBER ONE JOB of preparing for peace.

Address your projects list to Manager Business News Department, Engineering News-Record, 330 W. 42nd St., New York 18, N. Y.

MINIMUM SIZE OF PROJECTS PUBLISHED

Public Works	$25,000
Industrial Buildings	40,000
All Other Buildings	150,000

WATER SUPPLY

PROPOSED WORK

Minn., Belgrade—City, A. J. Borgerding, mayor, City Hall, drill well, furnish, install pump, construct pumphouse, **$15,000.**

Minn., Hastings—City, E. G. Sontag, clk., City Hall, watermain, sanitary sewer extens. **$30,000.**

N. Y., Beacon—City, City Hall, addnl. water storage reservoir, **$195,000.** State Aid Planning Funds allotted.

N. Y., Pawling—Village, impounding reservoir, **$100,000.** State Aid Planning Funds allotted.

N. Y., Woodstock—Town, water supply sys., **$130,000.** State Aid Planning Funds allotted.

★**Tex., Tyler**—W. H. Knight, mayor, Tyler, water imprvs., incl. distr. mains, **$200,000,** Financing provided; supply mains **$953,000,** treatment plant **$680,000.** Financing not provided.

Tex., Weslaco—G. W. Richardson, mayor, City Hall, water imprvs. **$15,000.** Financing provided.

PLANS UNDER WAY

Ark., Pocahontas—City, J. N. Pratt, mayor, City Hall, plans under way, WW imprvs. **$80,000.** Marion L. Crist & Associates, Union Life Bldg., Little Rock, consult engrs.

★**Colo., Colorado Springs**—City, City Hall, 6 year program imprv. water sys. incl. completion filter plant, settler, small earth dam, exten. mains, concrete lined irrigation ditch. **$1,425,000.** Financing provided. F. O. Ray, City Hall, city engr.

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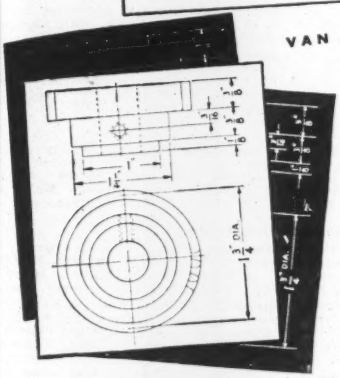

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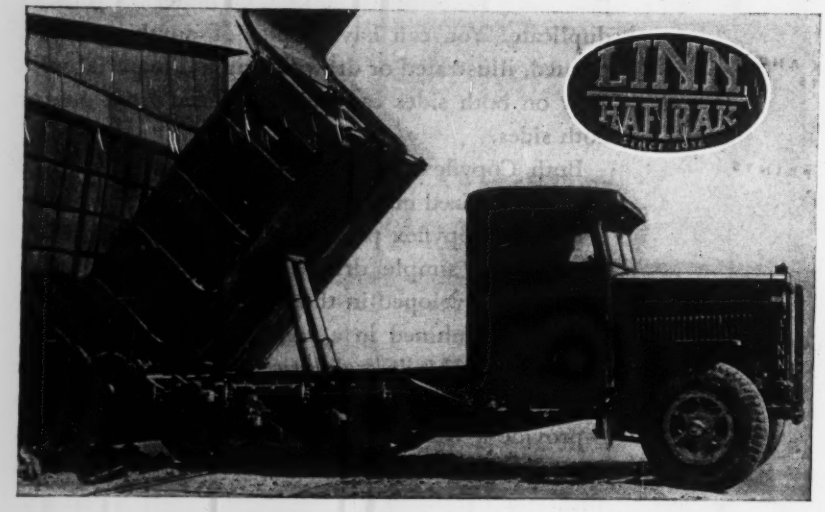

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POSTWAR PROJECTS (Cont'd.)

Idaho, Lewiston—City, City Hall, plans 50% completed 6,000 ft. 20 in. pipeline to reservoirs, **$50,000**; developing well or tower for supplementary water supply, **$10,000**; 4 mi. 6 and 8 in. pipe replacements, over **$25,000.** Financing provided. W. P. Hughes, City Hall, city engr.

Ia., Spencer—Spencer Municipal Utilities, Spencer, well and water lines, $57,782. Howard R. Green Co., 417 1 Ave. S.E., Cedar Rapids, consult. engr.

La., Colfax—Town, Town Hall, plans under way WW extens., **$33,000**; construct WW sys., **$25,000.** To vote bond issue. Pan-American Engineers, Alexandria, consult. engrs.

Mo., Thayer—City, S. G. Skaggs, mayor, City Hall, WW imprvs. **$30,000.** Russell & Axon, 4903 Delmar Blvd., St. Louis, consult. engrs.

O., Toledo—City, City Hall, 24 in. water-main in Glendale Ave. from Anthony Wayne Trail to Toledo Terminal RR right of way, **$96,000.** G. Schoonmaker, Safety Bldg., city mgr. and ch. engr.

Tex., Baird—H. W. Ross, Jr., mayor, City Hall, WW imprvs. **$180,000.** Financing provided. J. E. Ward, 545 Harvey-Snider Bldg., Wichita Falls, consult. engr.

Tex., Bangs—E. A. Medcalf, mayor, City Hall, plans 50% completed water imprvs. **$50,000.** Financing not provided. Freese & Nichols, Capps Bldg., Fort Worth, consult. engrs.

Tex., Crane—W. V. Steele, mayor, City Hall, plans 50% completed water supply, **$96,000.** Financing not provided. Koche & Fowler, Great National Life Bldg., Dallas, consult. engrs.

Tex., Denton—City, City Hall, plans 50% completed water imprvs., pump. unit, supply facilities, storage, etc. **$275,000**; c.i. distribution lines, **$100,000.** Bond election June 12 for same. J. E. Ward, Harvey-Snider Bldg., Wichita Falls, consult. engr. CD 2/8—ENR 2/22.

Tex., Marlin—City, City Hall, plans under way water imprvs., pump. station, purification plant, c.i. mains, etc. **$125,000.** Financing not provided. H. R. F. Helland, Frost Bank Bldg., San Antonio, consult engr.

Tex., Marlin—City, City Hall, plans under way earth and rein.-con. dam for water supply. **$125,000.** Financing not provided. H. R. F. Helland, Frost Bank Bldg., San Antonio, consult. engr.

Tex., Pharr—City, A. Kelley, mayor, plans 75% completed water plant expan., incl. 12 in. main, pump. unit, etc. **$45,000.** Bond election in June to finance due to invalidation of original financing plan. A. Tamm, 107 S. 1st St., Harlingen, consult. engr. CD 3/22—ENR 4/5.

Wis., Winneconne—Village, plans under way WW sys., incl. well, pump house, river crossing, pumps, elevated tanks, mains. **$110,000.** Financing not provided. McMahon Engrg. Co., Menasha, consult. engr.

READY FOR BIDS

Tex., Muenster—City, c/o Mayor, City Hall, plans completed WW imprvs. **$15,000.** Financing provided. J. E. Ward, Harvey-Snider Bldg., Wichita Falls, consult. engr.

Tex., Paris—J. W. Barnes, mayor, City Hall, plans completed water imprvs., incl. settling basins, rapid sand filters, chlorinators. **$250,000.** Financing provided. Freese & Nichols, Capps Bldg., Fort Worth, consult. engrs. W. Hicks, City Hall, city engr. CD 2/28—ENR 3/8.

SEWERS, WASTE DISPOSAL

PROPOSED WORK

Mass., Winthrop—Town, W. Smith, chm. Bd. Selectmen, Town Hall, incinerator for rubbish and refuse. **$25,000.**

Mass., Braintree—Town, Dpt. P. Wks., Town Hall, investigation under way incinerator plant, **$65,000.**

N. Y., Deposit—Village, sewerage sys. and treatment plant, **$200,000.** State Aid Planning Funds allotted.

N. Y., Hempstead—Town, garbage disposal plant, **$150,000.** State Aid Planning Funds allotted.

N. Y., Rochester—City, City Hall, sewage pump. station, force and outfall sewer from Lattimore and Kendrick Rds. to trunk sewer Elmwood Ave., University Sect. **$165,000**; sewers in Lake View Park, Beach Ave., Marion St., Seneca Parkway and Westmoreland Dr., **$97,000.**

★**N. Y., Utica**—City, sewage disposal plant and sanitary sewer, **$1,365,000.** State Aid Planning Funds allotted.

Tex., Cockrell Hill (mail Dallas)—City, 1014 Sunnyside St., sanitary sewers, **$40,000.** Financing not provided.

★**Tex., Tyler**—W. H. Knight, mayor, City Hall, inter lines and sewage treatment plant, **$595,000.** Financing provided.

Wash., Sedro Woolley—State Dpt. Finance, Insurance Bldg., Olympia, sewerage sys. for Northern State Hospital, **$70,000.** Financing provided.

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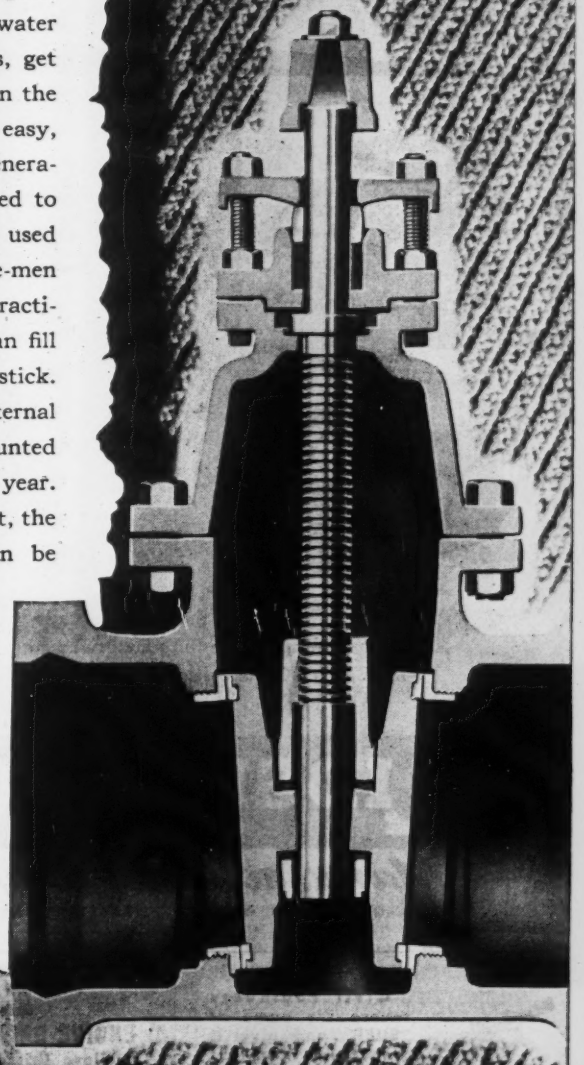

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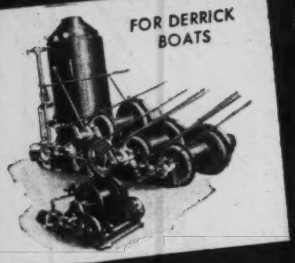

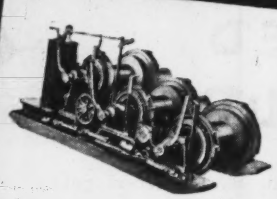

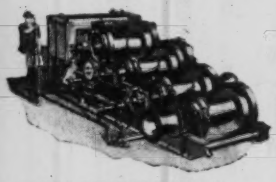

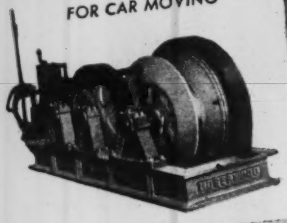

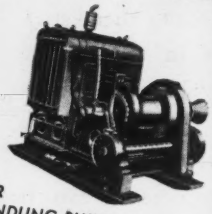

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POSTWAR PROJECTS (Cont'd.)

PLANS UNDER WAY

★ **Colo., Colorado Springs**—City, City Hall, plans 50% completed 6 year program 8 storm sewer projects about 15 mi.; concrete, clay tile sanitary sewer exten. $832,000. Financing provided. F. O. Ray, City Hall, city engr.

Idaho, Lewiston—City, City Hall, plans 75% completed 7,000 ft. 8 and 10 in. sewer mains in University addn., **$50,000**; sewer pumphouse, concrete, **$7,000**. Financing provided, W. P. Hughes, City Hall, city engr.

Ill., Savanna—City, City Hall, plans under way sewage treatment plant, $140,000. Howard R. Green Co., 208-210 Bever Bldg., Cedar Rapids, Ia., consult. engr.

★ **Ind., Evansville**—Bd. P. Wks., City Hall, sewage treatment plant, interceptor sewers, **$6,000,000**. Boyd E. Phelps, Inc., 622½ Franklin St., Michigan City, consult. engr. CD 9/22/44—ENR 10/5/44.

Ind., Indianapolis—Bd. P. Wks., Shirley Jenning, chn., City Hall, retained Russell B. Moore Co., consult. engr., 1456 N. Delaware St., to make survey entire city sewerage sys. and recommendations for imprvs. CD 7/23/43.

★ **Ind., Terre Haute**—Bd. P. Wks., V. R. McMillan, chn., City Hall, plans under way sewage treatment plant, interceptor sewers, **$3,000,000**. Metcalf & Eddy, Statler Bldg., Boston, Mass., consult. engrs. Thos. Hardman, Hippodrome Bldg., assoc. engr. CD 4/26—ENR 5/17.

Ia., Algona—City, City Hall, storm sewerage sys. **$25,000**. Howard R. Green Co., 208-210 Bever Bldg., Cedar Rapids, consult. engr.

Ia., Cresco—City, City Hall, plans under way sewage treatment plant addn. $40,000. Howard R. Green Co., 208-210 Bever Bldg., Cedar Rapids, consult. engr.

Ia., Van Horne—City, City Hall, plans under way sewerage sys., disposal plant, plant, **$50,000**. Howard R. Green Co., 208-210 Bever Bldg., Cedar Rapids, consult. engr.

Me., Winthrop—Town, Sewer Comn., Town Hall, sewerage sys., treatment plant. To exceed. **$25,000**. Metcalf & Eddy, 1300 Statler Bldg., Boston, Mass., consult. engrs.

Mont., Chester—City, City Hall, B. O. Nordstrom, clk., plans completed sanitary sewers and sewage disposal plant. **$70,000**. Financing not provided. Corwin & Co., Medical Arts Bldg., Great Falls, consult. engrs. CD 1/31—ENR 2/22.

Okla., Oklahoma City—City, City Hall, plans 5% completed garbage incinerator. **$50,000**. Legal obstacles to be overcome, financing not provided. R. Lee, City Hall, city engr.

Ore., Milton—City, H. H. Kramer, mgr., City Hall, plans completed sewer extens., sewage treatment plant. **$150,000**. Financing not provided. Cunningham & Associates, Builders Exch. Bldg., Portland, consult. engrs. CD 1/31—ENR 2/22.

Ore., Springfield—City, City Hall, plans under way trunk sewers, **$150,000**. $85,000 bond election June 22. A. W. Vaaler, City Hall, city engr.

S. D., Java—City, A. C. Schlepp, mayor, City Hall, preliminary plans completed sewage disposal sys., **$25,000**. A. S. Mannes, Aberdeen, consult. engr.

Tex., Bangs—E. A. Medcalf, mayor, City Hall, plans 50% completed sewerage sys. **$25,000**. Financing not provided. Freese & Nichols, 407 Capps Bldg., Fort Worth, consult. engrs.

Tex., Denton—City, plans 50% completed, sanitary sewerage sys. expan., imprvs. $275,000; storm sewers, **$100,000**. Bond election June 12 for same. J. E. Ward, Harvey-Snider Bldg., Wichita Falls, consult. engr. CD 2/7—ENR 2/22.

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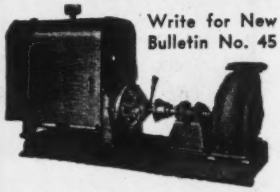

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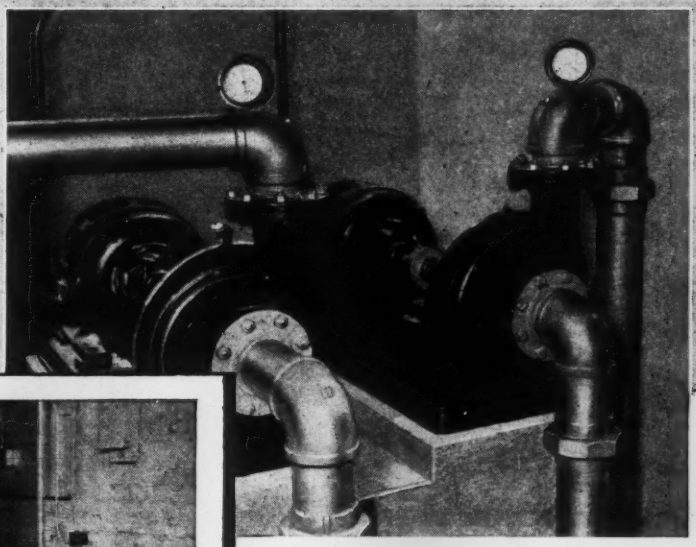

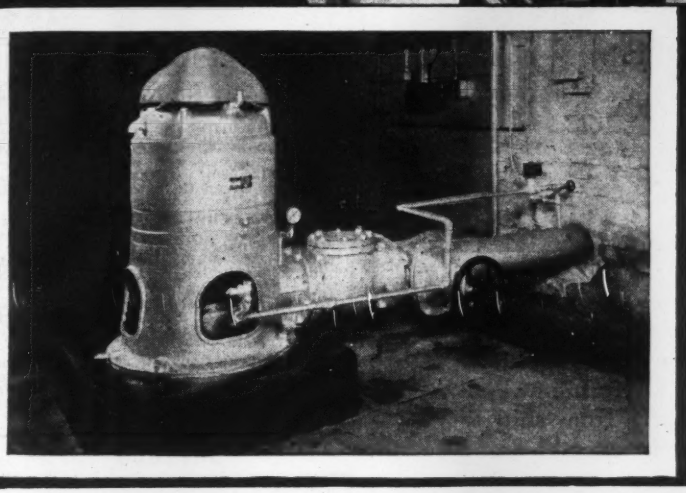

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POSTWAR PROJECTS (Cont'd.)

Tex., Fort Worth—S. H. Bothwell, mgr., City Hall, plans 50% completed storm sewer for North Main St. **$95,432.** M. Theiln, Fort Worth, asst. city engr. CD 2/21/44—ENR 2/24/44.

Tex., Paris—J. W. Barnes, mayor, City Hall, plans 50% completed sewer imprvs. **$100,000.** Financing provided. Freese & Nichols, Capps Bldg., Fort Worth, consult. engrs. W. Hicks, Paris, city engr. CD 3/5—ENR 3/22.

Tex., Pharr—City, A. Kelly, mayor, City Hall, plans 75% completed sanitary sewerage sys. imprvs. Bond election in June to finance due to invalidation of original financing plan. A. Tamm, 107 S. 1 St., Harlingen, consult. engr. **$65,000.**

Tex., Pleasant Grove (R. Sta. Dallas)—Dallas Co. Water Control & Imprvt. Dist. 3, c/o J. Simms, 9-22 N. Buckner St., Dallas, bond election June 16, sewerage sys., **$130,000;** sewage disposal plant, **$70,000.** Koch & Fowler, Great National Life Bldg., Dallas, consult. engrs. CD 5/9—ENR 5/17.

Tex., Texas City—E. A. Johnson, mayor, City Hall, plans 50% completed sewer mains, **$200,000;** plans storm sewers, **$250,000.** Financing not provided. J. J. Rady, Insurance Bldg., Fort Worth, consult. engr.

Tex., Weslaco—G. W. Richardson, mayor, City Hall, plans under way sewerage sys. with sewer treatment plant and storm sewers, **$63,500.** Financing provided.

Tex., West Columbia—Town, W. H. Pierce, mayor, City Hall, plans 50% completed sewage treatment plant, **$25,000;** storm sewers, **$25,000.** Financing not provided. S. A. Russell, Bay City, consult. engr. CD 4/27—ENR 5/18.

Wash., Port Townsend—City, City Hall, plans under way 9.4 mi. sewers in West Port Townsend, **$191,000.** Financing not provided. J. T. Lay, City Hall, city engr. CD 1/10—ENR 1/27.

★**Wash., Spokane**—City, F. G. Sutherlin, mayor, City Hall, plans under way sewage disposal plant and sewer lines, **$3,000,000.** Financing not provided. Greeley & Hansen, 6 N. Michigan Ave., Chicago, Ill., consult. engrs. E. S. Butler, City Hall, city engr. CD 4/2—ENR 4/19.

Wis., Winneconne—Village, plans under way exten. sewerage sys. **$25,000.** Financing not provided. McMahon Engrg. Co., Menasha, consult. engr.

READY FOR BIDS

Ill., Savanna—City, City Hall, plans completed sanitary sewer exten. and pump. plant, **$125,000.** Financing provided. Howard R. Green Co., 208-210 Bever Bldg., Cedar Rapids, Ia., consult. engr.

Ia., Mason City—City, City Hall, plans completed imprv. sewage treatment plant, **$250,000.** Financing provided. Howard R. Green Co., 208-210 Bever Bldg., Cedar Rapids, consult. engr. CD 5/17/44—ENR 6/1/44.

Ore., Mount Angel—City, City Hall, plans completed sewage disposal plant. $32,225. Financing provided. J. Hassler, City Hall, engr. CD 6/19/44—ENR 7/13/44.

Wis., Juneau—Juneau Utilities Comn., Juneau, plans completed sewage treatment plant, sewers, **$115,000.** Financing provided. McMahon Engrg. Co., Menasha, consult. engrs. CD 1/14/44—ENR 1/27/44.

BRIDGES

PROPOSED WORK

★**Idaho**—State Bureau Hys., T. M. Halley, state hy. dir., Boise, bridge across Clearwater River between 21 and 22 Sts. **$700,000.** Financing provided. CD 2/13—ENR 3/8.

★**Que., Montreal**—Municipality in association with Railways, bridging multiple railway lines, foot of Rockland Ave. **$1,000,000.**

PLANS UNDER WAY

★**Massachusetts**—Commonwealth of Massachusetts, 100 Nashua St., Boston, plans under way bridge, approaches (Scotts Bridge) over Deerfield River, part of Shelburne Falls Bypass, Route 2, Buckland and Charlemont, **$520,000;** bridge over Deerfield River on Route 2, Charlemont, **$150,000,** bridge over Millers River on Route 2A and 63, Ewing and Montague, **$100,000,** all foregoing Franklin Co.; reconstruct railroad bridge on Route 122 at Linwood, Worcester Co., **$200,000;** railroad bridge on Route 1A, Walpole, **$150,000;** construct highway grade separation on Route 1, at Nahaton St. exten., Norwood, **$200,000,** both Norfolk Co.; reconstruct railroad underpass on Route 32 (Gibb's Crossnig), Ware, **$150,000;** railroad bridge on Route 202 at Belchertown Station, **$150,000,** both Hampshire Co.; bridge over Merrimac River on Route 113, Essex Co., **$600,000.** Land rights not cleared, legal obstacles to be overcome, and financing not provided. Dpt. P. Wks., 100 Nashua St., Boston, engrs.

O., Toledo—Hy. Dpt. Lucas Co., Court House, plans completed 60 ft. span bridge at Wilkins Rd. at Swan Creek, **$25,000;** 48 ft. span bridge on Yondota Rd., at Scenic Creek, **$29,000.** Legal obstacles to be overcome, financing not provided. B. Kesting, Court House, co. engr.

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A general view of Gallager-Nelson's Universal 546-P primary crushing unit and "800" secondary crushing unit forming the "822-Q" quarry plant shown working near Polo, Ill. Note the close-coupled compactness of this electrically-powered rock reduction plant.

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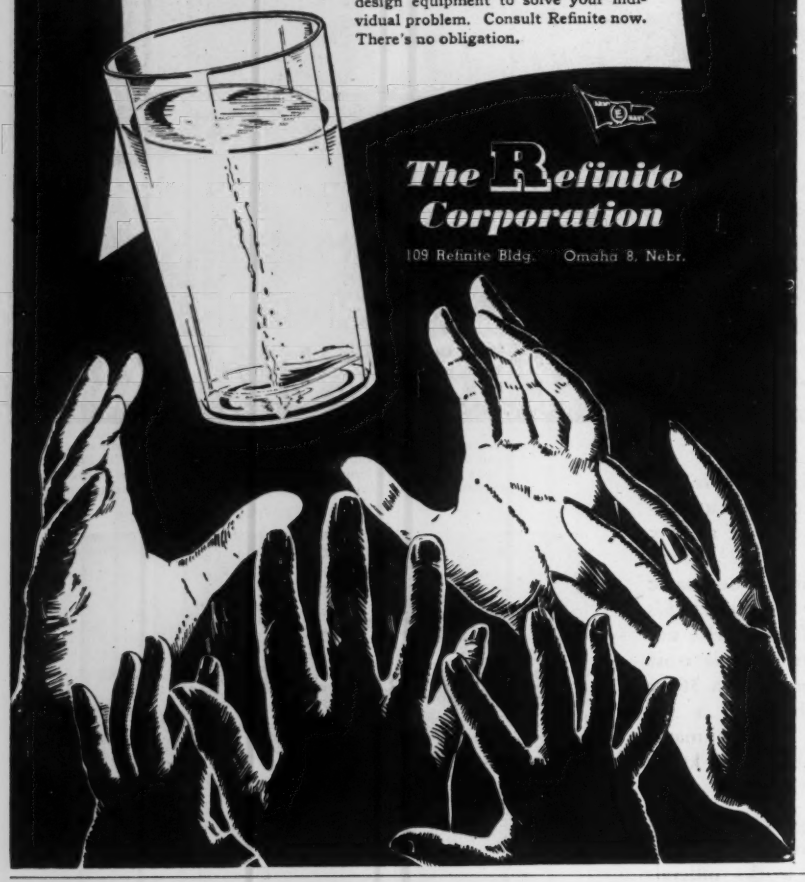

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POSTWAR PROJECTS (Cont'd.)

Wash., Republic—Ferry Co., Court House, bridge. **$30,000.** Financing partially available. B. O. Bendixen, Court House, co. engr.

★**Wash., Seattle**—City, County-City Bldg., 3 and James Sts., Zone 4, plans under way bridge over Duwamish River at 1 Ave. S. incl. exten. W. Marginal Way. **$1,900,000.** Financing not provided. C. L. Wartelle, County-City Bldg., city engr.

STREETS AND ROADS

PROPOSED WORK

★**N. Y., Central Islip**—Dpt. P. Wks., State Office Bldg., Albany, Zone 1, roads, walks and curbing at State Hospital, for Dpt. Mental Hygiene, State Office Bldg., Albany, Zone 1, **$500,000.**

N. Y., Fonda—Comrs. Montgomery Co., Fonda, reconstructing County Road 92, **$38,000.** State Aid Planning Funds allotted.

N. Y., Mt. Vernon—City, reconstructing Valentine St., **$30,300;** Lorraine Ave., from Esplanade to E. Lincoln Ave, **$30,700;** constructing Westchester Ave. from Primrose Ave. to Clinton St. **$90,400;** resurfacing Mersereau Ave. from E. Lincoln to Sidney Aves. **$13,600;** Center St., Birch and Orchard Sts. **$27,000;** Elm Ave. from Park to Claremont Aves. **$20,000;** N. High. St. from Mt. Vernon Ave., and Putnam St. **$26,300.** State Aid Planning Funds allotted.

N. Y., Port Chester—Village, installing macadam pavements. **$35,215.** State Aid Planning Funds allotted.

N. Y., Rochester—City, paving Spring St., **$27,000;** Campbell St., **$56,000;** Merrimac St., **$30,000;** Magee Ave., **$45,000;** Prince St., **$49,000.**

N. Y., Saratoga Springs—City, reconstructing Maple Ave. and Putnam St. **$28,920.** State Aid Planning Funds allotted.

Tex., Cockrell Hill (mail Dallas)—City, 1014 Sunnyside St., street imprvs. **$30,000.** Financing not provided.

Wis., Racine—Bd. Educ., A. H. Schafer, secy., City Hall, concrete curbs at schools, **$20,000;** surface playgrounds, **$30,000;** concrete curbs for running tracks, **$6,000.**

PLANS UNDER WAY

Colo., Colorado Springs—City, City Hall, 6 year program, street paving, street lighting, subway, 3 small steel bridges, **$288,000.** Financing provided. F. O. Ray, City Hall, city engr.

★**Conn., Hartford and West Hartford**—City of Hartford and Town of West Hartford, Dpt. P. Wks., Hartford, express highway from West Hartford to Hudson St. approaches to Park River conduit. **$10,000,000.** Financing not provided. R. Ross, City Hall, Hartford, engr.

★**Massachusetts**—Commonwealth of Massachusetts, 100 Nashua St., Boston, plans under way reconstruction State Hy. on Route 7, from Route 43 to New Ashford Village, **$330,000;** Route 8, from Hinsdale line to Backet line, **$300,000;** Route 7, Great Barrington to Sheffield, **$370,000;** Route 23, from Route 7 to point near Monterey line, **$165,000;** Route 9, from Windsor Village, westerly, **$360,000;** Route 8, from Hinsdale line, northerly **$120,000;** Route 8 from Washington line, northerly, **$145,000,** all foregoing in Berkshire Co.; Routes 5 and 10 from Greenfield to Vermont line, Franklin Co., **$500,000;** Route 5 from Holyoke line to Northampton, **$145,000;** Route 9 from Swift River to Cape St., **$280,000,** both in Hampshire Co.; Route 2 from Littleton Common to Route 110, **$410,000;** Route 20 from Weston Bypass to 1940 Project, **$560,000,** both Middlesex Co.; Route 3A, from Fair Grounds, southerly, Plymouth Co., **$200,000;** Route 140 from Grafton to Upton, **$500,000;** Route 110 from Route 12 to Clinton line, **$220,000;** Route 93, from Charlton City to Southbridge, **$250,000;** Route

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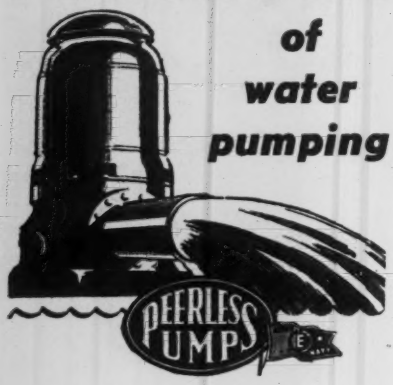

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POSTWAR PROJECTS (Cont'd.)

122-A, from Holden Village to Route 122, **$420,000**; Route 16, from Hopedale line to Uxbridge, **$280,000**; Route 32 from Route 2 to Petersham Village, **$440,000**, all foregoing in Worcester Co.; several old sections on Route 6, northerly roadway, Bristol Co., **$150,000**; constructing highway from Neponset River State Hy. in Hyde Park to Route 1, in Norwood, **$1,500,000**; American Legion Hy. exten. to Neponset River State Hy., **$870,000**, both Suffolk and Norfolk Counties; by. from Neponset River State Hy. in Hyde Park to Route 138 in Canton, Norfolk Co., **$1,500,000**; surfacing graded section of Route 2 Relocation, **$200,000**; widening Route 15 from Route 20 to Connecticut line, **$1,000,000**, both Worcester Co.; construct connection between Route 113 and Route 110 on North Bank of Merrimac River, Middlesex Co., **$600,000**; connection from Route 1A to Salisbury Beach Reservation, Essex Co., **$250,000**; exten. Squire Rd. to Revere Beach Parkway, Suffolk Co., **$500,000**; Massachusetts Section of Providence Circumferential from Rhode Island line to Route 1, Bristol Co., **$570,000**; relocation Route 9 from June and Mill Sts. to Route 9, in Leicester, Worcester Co., **$400,000**; bypass of Buzzards Bay, Routes 6 and 28, Barnstable Co., **$200,000**; construction North Adams on Route 2, **$800,000**; Lee Bypass Route 20, **$1,000,000**; bypass of East Lee, Route 20, **$400,000**; bypass of Lenox, Route 20, **$500,000**, all foregoing in Berkshire Co.; Shelburne Falls Bypass, Route 2, **$800,000**; bypass of South Deerfield, Route 5, **$865,000**, both Franklin Co.; bypass of Lunenburg, Route 2, **$200,000**; bypass of Webster on Route 12, **$180,000**; Lincoln Square on Route 9, **$1,000,000**, all foregoing Worcester Co.; Winchester Square on Route 38, Middlesex Co., **$1,000,000**. Land rights not cleared, legal obstacles to be overcome, financing not provided. Massachusetts Dpt. P. Wks., 100 Nashua St., Boston, engrs.

★**Missouri**—State Hy. Comm., Jefferson City, plans 90% completed, graded earth and surfacing 3.416 mi. Route B from Phelps Co. north to present construction, **$26,200**; 7.66 mi. Route J, from Route M west to Fredericksburg, **$49,100**, both Gasconade Co.; 2.9 mi. Route V, from Route 10C southwest to Didehoise, **$25,000**; 72 mi. Route Y, from Route E south thru Boeuf Creek to present construction, **$57,500**; 8.6 mi. Route N, from Robertsville southwest to Route 30, **$43,000**, all foregoing Franklin Co.; 0.8 mi. Route B, from Morse Hill southeast to Route C, **$61,500**; 7.1 mi. Route M, from Rt. 21 T. R. southeast to Route 61 at Barnhardt, **$27,900**; 12.9 mi. Route Y, from Rt. 21 at De Soto northwest to present construction, **$67,900**, all foregoing Jefferson Co.; 3.544 mi. Route M, from Ironton west towards Reynolds Co., Iron Co., **$40,000**; 6.8 mi. Route P, Route 25 east to Rt. C, at Crosstown, **$30,900**; 10.16 mi. Route E, from Perryville northeast to Route C, **$44,000**, both Perry Co.; 11.4 mi. Route T, from present construction south to Route E94 near Augusta, **$60,700**; 5.838 mi. road from Rt. 61 at St. Peters north to Peruque, **$30,000**, both St. Charles Co.; 4.5 mi. Route E, from Route 61 at Estu east to St. Genevieve Co., **$25,000**; 3.25 mi. Route E, from Rt. 61 north to Jefferson Co., **$25,300**; 3.972 mi. Route H, from Madison Co., north to present construction, **$36,600**, all foregoing St. Francois Co.; 1 mi. Route N, from Route Z south to Saline Creek, **$28,800**; 4.325 mi. Route Z, from Rt. N east to Route 25, **$52,300**; 4.876 mi. Route F, from west of Coffman, west to St. Francois Co., **$26,000**, all foregoing St. Genevieve Co.; 2 mi. Route C, from west end of present construction west of Montgomery Co., **$25,000**; 2.903 mi. Route C, from piers west to present construction at Road SN, **$28,600**, both Warren Co.; 6.37 mi. Route N, from Crawford Co., east to Route D, **$34,700**; 6.114 mi. Route J (17), from Mill Creek crossing southeast of Cadet, **$25,000**; 19.36 mi. Route D, from present construction northwest to Franklin Co., **$71,300**, all foregoing Washington Co.; 8.18 mi. Route D, from Route 54 at Cedar Springs southeast to Route N, **$59,200**; 21.26 mi. Route B, from Vernon Co. east to Rt. A to Jerico Springs, **$25,000**, both Cedar Co.; 7.05 mi. Route F, from Rt. B, west to Jasper C., **$40,000**; 3.54 mi. Route U, from Rt. C east to Greene Co., **$25,000**, both Dade Co.; 9 mi. Route U, road from LaRussell east and south to Route 14, **$45,000**; 0.693 mi. Route C, between Rt. 66 and Stolts City, **$31,900**, both Lawrence Co.; 7 mi. Route M, from Rt. B (43), west to Route 57 north of Asbury, **$40,000**; 8.856 mi. Route M, from Rt. 71 west to Route B (43), **$58,000**; 10.063 mi. Route N, from Rt. 71 east to Route J, **$52,200**, all foregoing Jasper Co.; 3.02 mi. Route H, from Rt. Z west to Route 71, **$38,000**; 3.977 mi. Route K, from Kansas line east to present construction, **$40,200**; 0.396 mi. Route K, from Dry Wood Creek, northwest to Liberal, **$28,400**, all foregoing Barton Co.; 6.545 mi. Route C, from McDowell southeast to Rt. AA, **$70,000**; 12.434 mi. Route Z, from Monett east to Route J (39), **$72,000**, both Barry Co.; 3.044 mi. Route J, from Amsterdam west to Kansas line, **$28,000**; 7.483 mi. Route H, from present construction east thru Spruce to Henry Co., **$81,700**; 10 mi. Route F, from Route 71 at Passaic west to Rt. J, **$75,000**, all foregoing Bates Co.; grading, concrete surfacing 0.42 mi. Route VV, from Sappington Barracks, Rd. south to present pavement, **$51,900**; 3.26 mi. Route V, from St.

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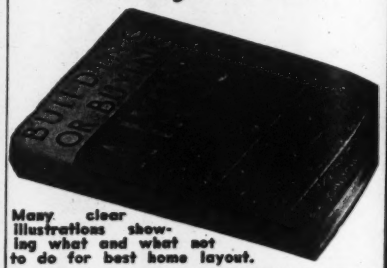

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POSTWAR PROJECTS (Cont'd.)

Louis City limits to Sappington Barracks Rd., **$304,300;** 0.815 mi. Route D, from Henry Rd. to Pennsylvania Ave., **$90,400;** 1.755 mi. Route U, from Pennsylvania Ave. to Lucas Hunt Rd., **$375,000;** 2.6 mi. Route N, from Natural Bridge Rd. to Ferguson, **$354,800;** 0.225 mi. Route N, from Inters Natural Bridge Rd., Kienlen Ave., etc., in Pine Lawn, **$50,000,** all foregoing St. Louis Co. graded earth slab, bituminous surfacing 0.543 mi. Route (8), from Big Creek relocation near Washington Co. line, St. Francois Co., **$79,200;** graded earth and surfacing 6.18 mi. Route H, from Rt. 39 east to Cane Hill, **$25,700;** 6.774 mi. Route H, from Seybert Northeast to Rt. C at Boone, **$50,000;** C. W. Brown, Jefferson City, ch. engr.

O., Toledo—Lucas Co., Hy. Dpt., Court House, Zone 4, plans 10% completed asphaltic concrete paving 0.8 mi. Douglas Rd., **$59,000;** plans 50% completed 1.26 mi. Glendale Ave., **$75,000.** Legal obstacles to be overcome, financing not provided. B. Keating, co. engr.

Tex., Brownsville—Cameron Co., O. C. Dancy, judge, Brownsville, plans under way farm-to-market roads. **$454,000.** Financing provided.

Tex., El Dorado—City, City Hall, street paving, **$100,000.** Funds available. Koch & Fowler, Great National Life Bldg., Dallas, consult. engrs.

Tex., Paris—J. W. Barnes, mayor, City Hall, preliminary plans under way paving imprv. certain streets, **$60,000.** Financing provided. Freese & Nichols, Capps Bldg., Fort Worth, consult. engrs. W. Hicks, Paris city engr. CD 4/20/44—ENR 5/4/44.

Wash., Port Townsend—City, City Hall, plans under way bituminous surface treatment, road mix type B city streets, **$258,000.** Financing not provided. J. T. Lay, City Hall, city engr.

★**Wash., Port Townsend**—Jefferson Co. Court House, plans under way relocating, constructing 4.5 mi. Chimacum-Quilcene Rd., **$136,000;** 7.2 mi. Shine Rd., **$121,000;** 2.3 mi. Oak Bay-Mats Rd., **$50,000;** 2.5 mi. Anderson Lake Rd., **$54,500;** location, construction 4.1 mi. Cape George to Chevy Chase Rd., **$33,700;** grading, draining Class B road mi. surfacing 9. mi. Port Townsend to Port Ludlow Rd., **$100,000;** 2 mi. Station Prairie Cut-off, **$27,000;** 5.03 mi. Chimacum to Center Rd., **$72,000.** Financing partially prpovided. J. T. Lay, Court House, co. engr. CD 1/10/44—ENR 1/27/44.

Wash., Republic—Ferry Co., Court House, 12 mi. road, **$100,000;** 50 mi. road oiling and imprvs., **$90,000.** Financing partially available. B. O. Bendixen, Court House, co. engr.

★**Wash., Seattle**—City, County-City Bldg., 3 and James Sts., Zone 4, plans under way widening, repaving Roosevelt Way from E. 40 to E. 75 Sts., **$1,200,000;** exten. Boren Ave. from Bway. to Rainier Ave. and Jackson St., paving, repaving present Borne Ave. from Bway. to Denny Way with grade separation viaducts over Terry, Westlake and Aves., **$450,000.** Financing not provided. C. L. Wartelle, County-City Bldg., city engr.

EARTHWORK, WATERWAYS

PROPOSED WORK

Pa., Erie—Commonwealth of Pennsylvania c/o M. James, chn. Postwar Planning Com., Harrisburg, completion sys. of jetties and bulkheads, Presque Isle Peninsula. $300,000. Financing not provided.

PLANS UNDER WAY

Wash., Port Townsend—City, City Hall, plans under way earth-filled dam at Lords Lake, **$26,500;** concrete refacing city reservoir, **$10,000.** Financing not provided, J. T. Lay, City Hall, city engr.

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PUBLIC BUILDINGS

PROPOSED WORK

Conn., Bridgeport—City, Bd. Educ., Main St., brick, steel Technical High School, Congress St. Over **$150,000.** Financing not provided.

Conn., Bridgeport—City, J. A. Sohon, librarian, 925 Broad St., branch library expan., incl. North Bridgeport, Main St., Beachwood Ave. and Norman St., West End; Boston Ave. Section, East End; Sylvan Ave., Sylvan Crest Section; Burroughs Library addn. for Art and Music Dpts., and Circulating Picture Collections. Over **$150,000.** Financing not provided.

Ga., Albany—State Bd. Educ., Atlanta, bldgs. at State College. **$460,000.**

Ga., Carrollton—State Bd. Educ., State Office Bldg., 24 Capital Sq., S.W., Atlanta, addnl. bldgs., at West Georgia College, **$375,000.**

Ga., Statesboro—State Bd. Educ., State Office Bldg., 24 Capitol Sq. S.W., Atlanta, addnl. bldgs., facilities at South Georgia College. **$425,000.**

★ **Idaho, Boise**—School Bd., Dr. H. S. Colver, pres., Boise, defeated **$1,535,000** bonds 2 school bldgs., 3 school addns. modernizing other bldgs. CD 3/28—ENR 4/15.

Ind., New Castle—City, City Hall, high school addn., incl. auditorium, gymnasium, cafeteria, bookstore, home economics and commercial department, **$150,000** or more; 2 story, bsmnt. school for Sunnyside section of city, **$150,000** or more.

Mass., Methuen (br. Lawrence)—Town, Supt. Schools, Town Hall, making surveys high school or high school addn. To exceed **$150,000.**

Mass., Pittsfield—City, Supt. Pub. Bldgs., City Hall, storehouse. To exceed **$50,000.**

Mass., West Newton (br. Boston)—City, School Dpt., City Hall, making preliminary surveys school, **$150,000.**

Mich., Marquette—Michigan College of Education, Dr. H. A. Tape, pres., Marquette, girls dormitory, **$200,000.**

★ **Minn., Chisholm**—J. J. Dwyer, 1728 E. 3 St., Duluth, central heating and electric power plant, **$500,000.**

Minn., Hibbing—State, c/o State Land & Minerals Div., R. D. Nolan, dir., 14 State Office Bldg., mines and minerals bldg. **$150,000.** Financing provided.

Minn., Minneapolis—State Hy. Dpt., 1246 University Ave., St. Paul, testing laboratory on main campus of University of Minnesota, **$200,000.**

★ **Mo., Clayton**—St. Louis Co., c/o County Court, Clayton, St. Louis, Zone 5, defeated **$4,250,000** bonds, courthouse and War Memorial bldg., incl. 2,000 seat auditorium. CD 3/19—ENR 4/5.

★ **N. Y., Central Islip**—Dpt. P. Wks., State Office Bldg., Albany, Zone 1, bldg. for 504 Ambulatory TB patients, **$1,584,000;** heating sys., Groups G, H. I and K, **$104,000;** altering Groups G, H. I and K, **$250,000;** addn. to Bldg. 42G, **$22,000;** power plant and service connections, **$1,700,000,** all at State Hospital for Dpt. Mental Hygiene, State Office Bldg., Albany, Zone 1.

N. Y., Cobleskill—Dpt. P. Wks., State Office Bldg., Albany, Zone 1, farm mechanics bldg., at New York State Agricultural and Home Economics Institute. **$48,000.**

N. Y., Newburgh—Lower Hudson Regional Market Auth., Newburgh, cold storage bldg., addn. **$43,000.** State Aid Planning Funds allotted.

N. Y., New York—Dpt. P. Wks., Municipal Bldg., Zone 7, Harlem Retail Market for Dpt. Markets, 137 Centre St., Zone 13. **$350,000.** Financing not provided.

Ore., Pendleton—School Bd., Pendleton, election June 18, on special levy to raise $100,000, school addns. **$200,000.** Financing not provided.

★ **Pa., Cresson**—Commonwealth of Pennsylvalia, c/o State Health Dpt., Harrisburg, sanitarium construction, addns. **$1,983,850.** Financing not provided.

Pa., Erie—Commonwealth of Pennsylvania, c/o Dpt. Military Affairs, Harrisburg, imprv. soldiers and sailors homes. **$150,000-$200,000.** Financing not provided.

Pa., Mont Alto—Commonwealth of Pennsylvania, c/o State Dpt. Health, Harrisburg, tuberculosis sanitarium alteratons, addn. **$488,180.** Financing not provided.

Pa., Pottstown—School Dist. of Pottstown, Beach and Penn Sts., high school. **$150,000.** Financing provided.

Pa., West Hamburg—Commonwealth of Pennsylvania, c/o State Health Dpt., Harrisburg, sanitarium, construct., addns. **$363,750.** Financing not provided.

R. I., North Kingstown—State Dpt. P. Wks., State House, Providence, 1 story, brick, concrete garage, Belleville. **$45,000.** Financing not provided.

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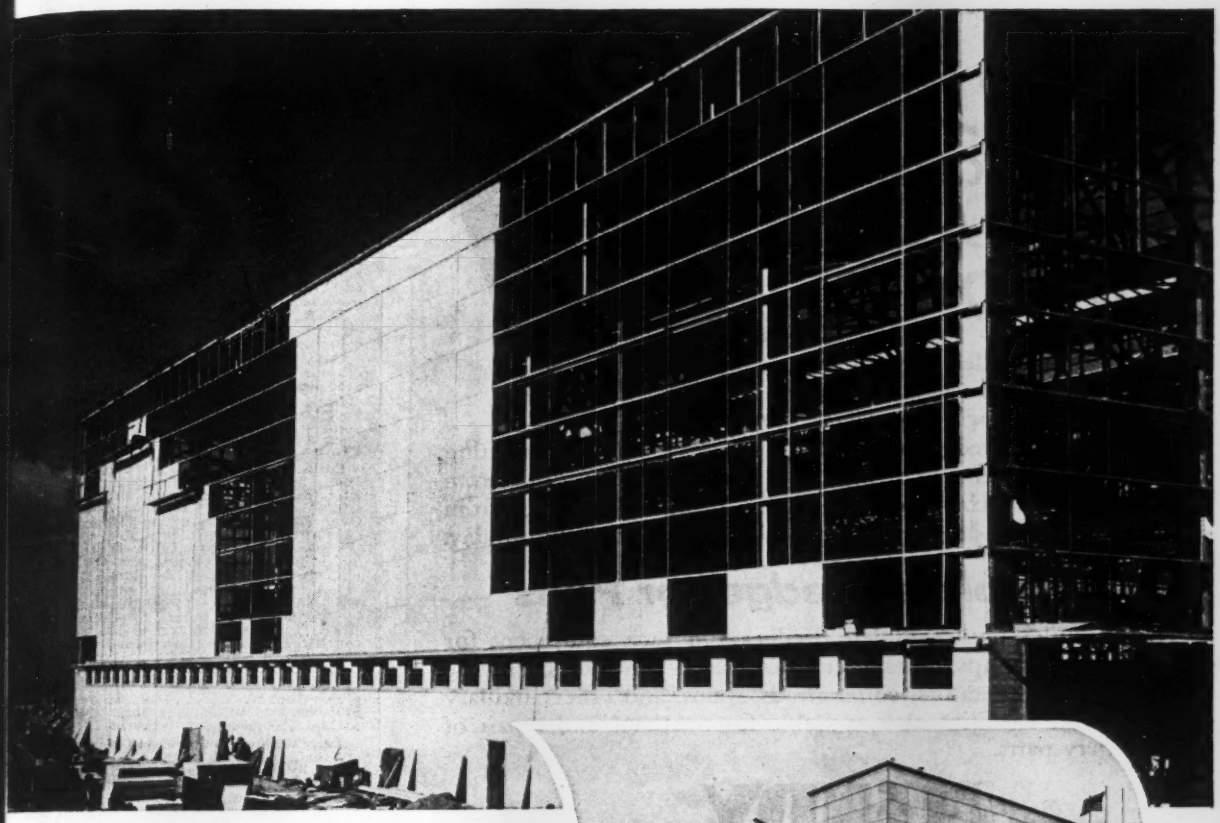

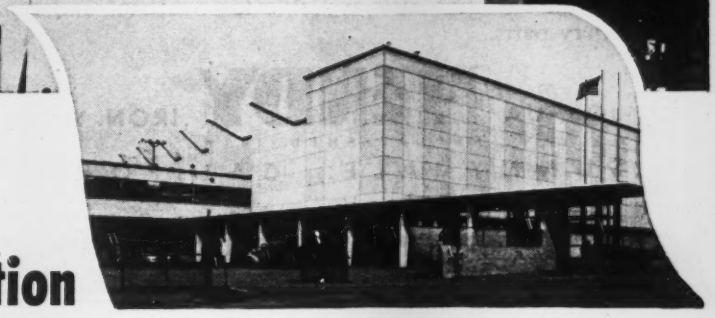

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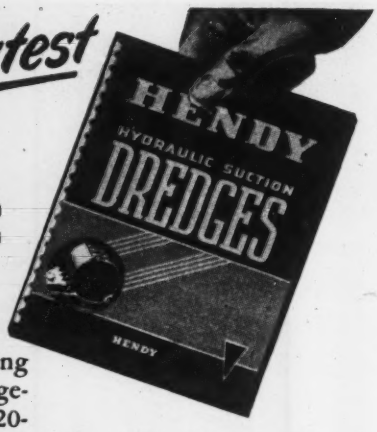

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POSTWAR PROJECTS (Cont'd.)

R. I., Warren—Town, J. M. Harkins, supt. Schools, Warren, 2 story high school addn. Burr's Hill Park, **$150,000.** Financing not provided.

Tenn., Ripley—Lauderdale Co., C. O. Chairman Bd., Ripley, hospital. **$250,000.**

★ **Va., Radford**—State, Richmond, administration bldg., dormitories and improv. bldgs. at Radford College, **$3,000,000.** Financing not provided. CD 10/11—ENR 10/19.

Wash., Bellingham—Port of Bellingham, H. F. Isler, mgr., Bellingham, addn. to bldg. occupied by Bellingham Furniture Mfg. Co. for furniture mfg. **$45,000.** Financing not provided.

Wash., Tacoma—Tacoma Public Schools, P. O. Box 1357, Zone 1, E. M. Wetherell, bus. mgr., rein.-con. bldg. for maintenance, shops and warehouses. **$100,000.** Financing not provided.

N. B., Fredericton—Municipality, in association with Citizens Com., Fredericton, community center as war memorial, **$150,000.**

Ont., Chatham—Municipality, combined chronic and communicable disease hospital, **$150,000.**

Ont., Toronto—Public School Bd. Educ., Toronto, replacing Aberdeen School, **$278,250**; Somerset School, **$190,000.**

PLANS UNDER WAY

Calif., Arcata—Arcata Union High School Dist., Arcata, plans by J. H. Mitchell, 340 Pine St., San Francisco, auditorium bldg., addnl. classrooms, shops, gymnasium, etc. Over **$150,000.** Financing not provided.

★ **Calif., Visalia**—Tulare Co., Court House, plans by D. Horn, Rowell Bldg., Fresno, courthouse enlargement, **$500,000.** Financing not provided. CD 3/19—ENR 4/5.

Ind., Indianapolis—Bd. School Comrs., A. B. Good, bus. dir., 150 N. Meridian St., plans by Vonnegut & Bohn, 1106 Hume-Mansur Bldg., 2 story, bsmnt., brick, stone, rein.-con. Broad Ripple High School addn. **$300,000.** CD 12/6/44—ENR 12/28/44.

Ia., Guthrie Center—Guthrie Co., Guthrie Center, plans by Tinsley, McBroom & Higgins, Hubbell Bldg., Des Moines, hospital, **$150,000.** Plans $50,000 bond election. Approved $100,000 bond issue in 1944.

La., Baton Rouge—Louisiana State Dpt. of Inst., R. L. Pettit, dir., Baton Rouge, plans by Hayes Town, Masonic Temple, two 2 story dormitories, 1 story school, 1 story warehouse, superintendents residence, at State Industrial School for Colored Youths, **$300,000.**

La., Pineville—State Dpt. Institutions, R. L. Pettit, dir., Baton Rouge, plans by C. T. Roberts, Alexandria, bldg. repairs, alterations at Central Louisiana State Hospital. **$250,000.** CD 4/27—ENR 5/17.

Me., Calais—City, E. A. Woodman, mayor, City Hall, plans 50% completed by A. J. Harriman, 88 Shepley St., Auburn, 2 story, 65x170 ft. high school, 48x85 ft. gymnasium, 65x90 ft. auditorium. **$200,000.** CD 516—ENR 5/31.

Minn., Alexandria—Bd. Educ., Mrs. J. K. LeRoy, clk., plans by Toltz, King & Day, 1509 Pioneer Bldg., St. Paul, school, remodeling high school. **$225,000.** Financing provided. CD 4/11—ENR 4/19.

Mo., Bowling Green—City, O. N. Bell, mayor, City Hall, power plant and WW imprvs. **$200,000.** Russell & Axon, 4901 Delmar Blvd., St. Louis, consult. engrs.

★ **Mo., Richmond Heights—Maplewood (St. Louis, P. O. 17)**—Maplewood-Richmond Heights School Dist., E. R. Adams, supt., 7539 Manchester Ave., Maplewood, St. Louis, Zone 17, preliminary plans by Wm. B. Ittner, Inc., 408 Bd. Education Bldg., 911 Locust St., St. Louis, Zone 1, auditorium-gymnasium at Senior High School, 7539 Manchester Ave., Maplewood, and at West Richmond School, 1313 Boland Ave., Richmond Heights, and general repairs to schools in district, **$625,000.** Bonds voted.

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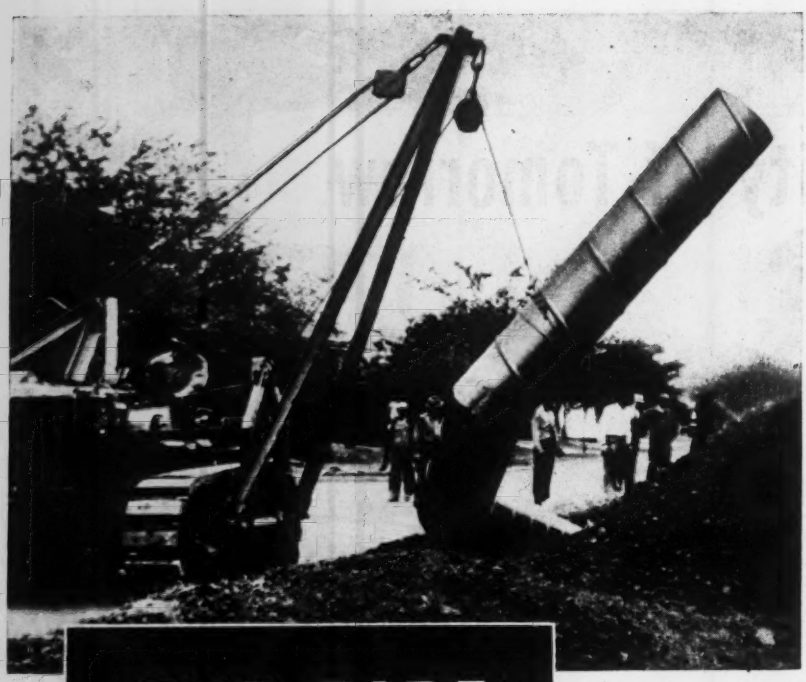

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POSTWAR PROJECTS (Cont'd.)

★**O., Athens**—Ohio University, Athens, plans completed by T. E. Brand, state archt., State Office Bldg., Columbus, science bldg. and equip., **$500,000**; rehabilitation Cutler Hall, **$100,000**; remodeling Ewing Hall, **$110,000**. Financing not provided.

★**O., Columbus**—Ohio State University, Columbus, Zone 10, plans completed by Howard Dwight Smith, Ohio State University agricultural laboratories, **$450,000**; power plant, equip., **$730,000**; recitation bldg. (1 wing) **$850,000**; service center, incl. stores, laundry, garage and food service, **$100,000**. Financing not provided. CD 11/17—ENR 11/30.

O., Dayton—State Hy. Dpt., Columbus, plans completed garage. **$90,000**. Financing not provided.

O., Kent—Kent State University, Kent, plans completed by T. E. Brand, state archt., State Office Bldg., Columbus, student health center, **$144,000**; Industrial Arts Bldg., **$129,420**; Moulton Hall addn., **$35,000**. Financing not provided. CD 12/27/43, 1/10/44—ENR 1/13/44, 1/27/44.

O., Maumee—Hy. Dpt. Lucas Co., Court House, Toledo, plans completed 1 story brick maintenance garage addn. **$60,000**. Legal obstacles to be overcome and financing not provided. B. Kesting, Court House, Toledo, co. engr.

★**O., Oxford**—Miami University, Oxford, plans completed by T. E. Brand, state archt., State Office Bldg., Columbus, center section for science hall, **$280,000**; men's dormitory, **$314,000**; women's dormitory, **$200,000**; new service tunnels, **$57,000**. Financing not provided. Fosdick & Hilmer, Union Trust Bldg., Cincinnati, consult. engrs. CD 2/21—ENR 3/8.

★**Ore., Corvallis**—State Bd. Higher Education, University, Eugene, plans completed by Stanton & Johnson, Railway Exch. Bldg., Portland, women's dormitory, **$300,000**; plans completed by Stanton & Hollis, Railway Exch. Bldg., Portland, men's dormitory, **$450,000**; agricultural and dairy mfg. bldg., **$370,000**; plans completed by Jones & Marah, Woodlark Bldg., Portland, electrical engineering wing, **$200,000**, at Oregon State College. Financing not provided. CD 3/30—ENR 4/19.

★**Ore., Eugene**—State Bd. Higher Education, University of Oregon, plans completed by Lawrence & Lawrence, Failing Bldg., Portland, Natural History Museum bldg., **$600,000**; women's dormitory addn., **$250,000**; student union bldg., **$700,000**. Financing not provided. CD 2/14—ENR 3/8.

Ore., Hillsboro — Hillsboro School Dist., Hillsboro, plans completed by Annand & Kennedy, Central Bldg., Portland, exten. David Hill School. **$325,000**. Financing not provided. CD 1/25—ENR 2/8.

Ore., McMinnville — City, City Hall, plans completed by T. Burns, Pittock Block, Portland, 2 story, rein.-con., brick veneer city hall. **$175,000**. Financing not provided. CD 4/25—ENR 5/3.

★**Ore., Portland**—State Bd. Higher Education, University of Oregon, plans completed by Lawrence & Lawrence, Failing Bldg., general hospital, University of Oregon Medical School. **$750,000**. Financing not provided. CD 2/14—ENR 3/8.

Tex., Dallas—Bd. Educ., Akard and Royal Sts., plans by R. D. Goodwin, Construction Bldg., school. **$150,000**. Financing provided.

★**Tex., Denton**—City, City Hall, plans 50% completed expan., imprv. municipal electric light and power plant sys. **$700,000** bond election June 12. J. E. Ward, Harvey-Snider Bldg., Wichita Falls, consult. engrs. CD 2/7—ENR 3/8.

Tex., Mission—Alton Independent School Dist., Rte. 2, c/o W. H. Doyle supt., Mission, plans 40% completed by R. Newell Waters, Weslaco, brick, rein.-con. school. **$150,000**. Financing not provided.

Wash., Cheney—Eastern Washington College, Cheney, plans completed by Geo. M. Rasque & Son, Washington Trust Bldg., Spokane, Zone 8, classroom and laboratory bldg., **$346,000**; rebuilding men's dormitory, **$75,000**. Financing not provided.

★**Wash., Pullman**—Washington State College, Pullman, plans by S. A. Smith, college archt., Pullman, Institute of Technology, **$1,250,000**; bldgs. for college farm, etc., **$175,000**; family life bldg., **$150,000**; Student Union Bldg., **$1,250,000**; residence hall for men, residence hall for women, apartment house for married veterans, each over **$150,000**. Financing not provided. CD 3/9/44, 3/9/45—ENR 3/23/44, 3/22/45.

★**Wash., Renton**—School Dist. 403, P. O. Box 359, plans by W. A. Mallis, Lyon Bldg., 3 and James Sts., Seattle, Zone 4, physical education bldg., vocational bldg. and 2 schools, **$150,000** each. Financing provided. CD 1/5—ENR 1/25.

★**Wash., Seattle**—University of Washington, E. 42 St., and 15 Ave. N.E., Zone 5, plans by Bebb & Jones, Hoge Bldg., 2 and Cherry Sts., Zone 4, 5 bldgs. for engineering school. **$2,700,000**. Financing not provided.

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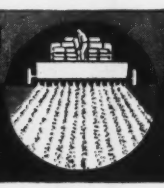


POSTWAR PROJECTS (Cont'd.)

★**Wash., Tacoma**—Tacoma Public Schools, P. O. Box 1357, Zone 1, plans by Mock & Morrison, consult. archts., Perkins Bldg. 1 story, bsmnt., Mann School, **$195,000**; 1 story, Sherman School, **$155,000**; 1 story, Lyon School addn., **$75,000**; 2 story bsmnt., Park Ave. school addn., with heating plant, **$66,000**; 2 story, bsmnt., Stanley School addn., **$66,000**; 2 story, bsmnt. Jefferson School addn., **$66,000**; 2 story, bsmnt., Franklin School addn., **$53,000**; 2 story, bsmnt. Grant School addn., **$144,000**; 1 story, Madison School addn., **$55,000**; 1 story, Manitou School addn., **$35,000**; 2 story McKinley School addn., **$66,000**; 2 story Rogers School addn., **$40,000**; 2 story, Lincoln High School addn., **$52,000**; 2 story, Sheridan School addn., **$40,000**; 2 story, Roosevelt School addn., **$66,000**; 2 story, Washington School addn., **$53,000**; 1 story Northeast Tacoma School, **$45,000**; 1 story, Arlington School addn., **$35,000**; 1 story Dash Point School addn., **$45,000**, all foregoing ordinary masonry construction; 2 story Mason Intermediate School addn., **$56,000**; 2 story, McGarver Intermediate School addn., **$56,000**, both rein.-con.; finish second story at Gray Intermediate School, **$48,000**; 2 story addn. to vocational shop bldg., mill constr., **$196,000**. Financing provided. CD 11/20—ENR 11/30.

★**Wis., Racine**—Bd. Educ., City Hall, A. H. Schafer, secy., plans by F. J. Hoffman, 201 6 St., Wm. Horlick High School addn., **$100,000**; remodel auditorium in same high school, **$150,000**; addns. to Park and William Horlick High School, **$30,000**; school shops and offices, **$200,000**; remodel auditorium in Park High School, **$150,000**; Roosevelt School addn., **$50,000**; swimming pools at 2 high schools, **$150,000**; modernize lighting in schools, **$25,000**; boilers, stokers in schools, **$22,000**; motorize heating fans and air filters in schools, **$40,000**.

★**Ont., Ottawa**—Dpt. Health & Welfare, Transportation Bldg., plans by C. D. Sutherland, Dpt. P. Wks., Ottawa, laboratory bldg., housing Food and Drug Laboratories, Laboratory of Hygiene, Industrial Hygiene Laboratories, etc. **$1,000,000**.

READY FOR BIDS

★**Ga., Valdosta**—State, Atlanta, plans completed music bldg., infirmary, dining hall, kitchen, gymnasium and addnl. dormitory wing, **$569,000**; auditorium, **$150,000**, all at State College for Women. Financing provided. University of Georgia, Athens, engr.

Ore., Bend—Bend School Dist., Bend, plans completed by Stokes & Allyn, Hughes Bldg., Portland, gymnasium bldg. at Bend High School. **$150,000**. Financing provided. CD 4/20—ENR 5/3.

Ore., Pendleton—Umatilla Co., Pendleton, Wm. R. Meiners, comr., plans completed court house and jail. **$400,000**. 4-year levy voted for 1946 construction, Wm. R. Meiners, Pendleton, engr. CD 12/21—ENR 1/11/45.

★**Wash., Bellingham**—Western Washington College of Education, Bellingham, plans completed by Bebb & Jones, Hoge Bldg., 2 and Cherry Sts., Seattle, Zone 4, industrial arts bldgs., **$250,000**; men's dormitory, **$180,000**; completing heating plant, **$138,000**. Financing provided.

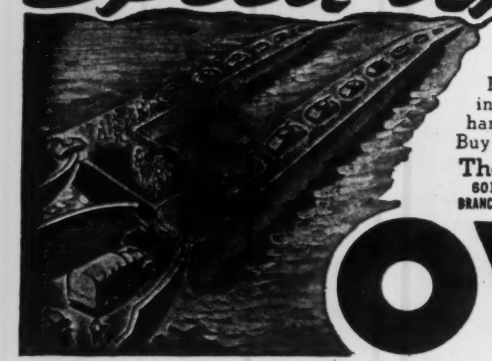
★**Wash., Ellensburg**—Central Wash. College of Education, Ellensburg, plans completed by J. N. Maloney, Larson Bldg., Yakima, science bldg. and central heating plant, **$756,000**. Financing provided. CD 11/22—ENR 12/14.

Wash., Spokane—School Bd., W. 503 4 Ave., plans completed by Whitehouse & Price, Hutton Bldg., 2 story Field School, **$150,000**. Financing provided. CD 5/2—ENR 5/17.

ADVANCED TO ACTIVE STATUS

★**La., Jackson**—East Louisiana State Hospital, c/o Bd. Directors, Baton Rouge, project cancelled bldg. housing 320 patients, **$360,000**; hospital bldg. housing 230 patients,

Speed Up — HANDLING OPERATIONS



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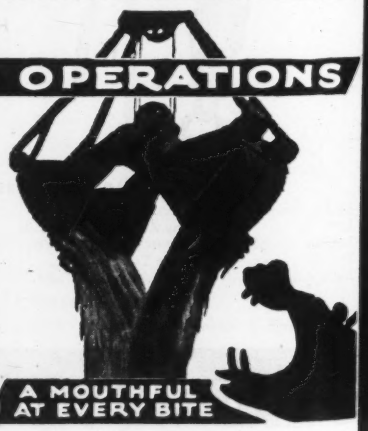

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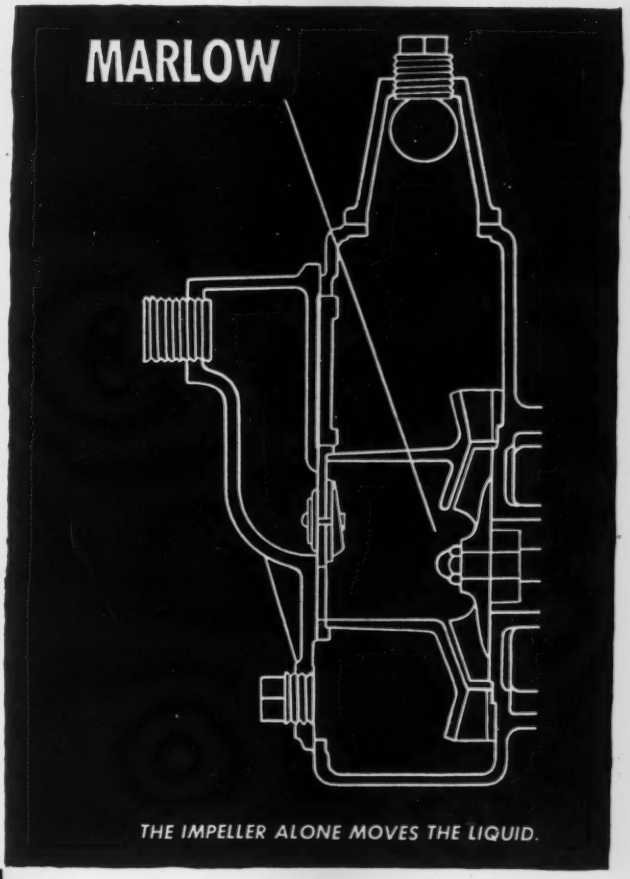
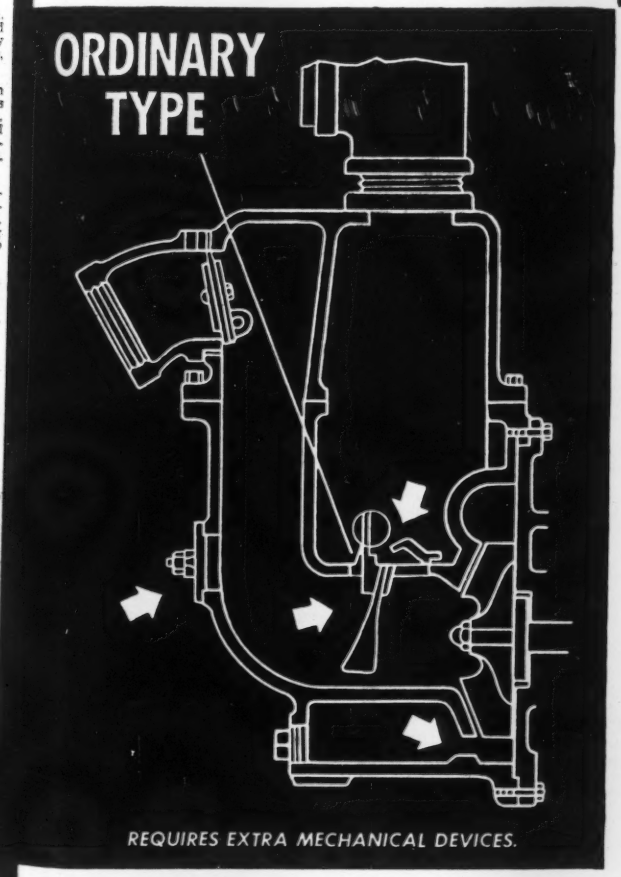


THE IMPELLER ALONE MOVES THE LIQUID.



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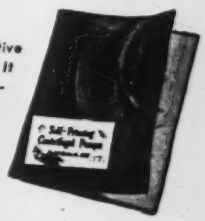

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POSTWAR PROJECTS (Cont'd.)

$275,000; hospital bldg. housing 210 patients, **$225,000**; hospital bldg. housing 80 patients, **$150,000**. Work now going ahead CD 2/21—ENR 3/8.

★**O., Mount Vernon**—State, Columbus, project cancelled, 2 units, 1 housing 75 female and other 75 male tubercular mentally ill patients, **$900,000**. Work now going ahead. CD 7/1/43—ENR 7/8/43.

Tex., Borger—Bd. Educ., City Hall, project cancelled Senior High School. **$200,000**. Work now going ahead. CD 11/6—ENR 11/16.

Tex., Eagle Pass—City of Eagle Pass and Maverick Co., Eagle Pass, project cancelled 1 and 2 story, L-shaped 34 x 306 ft., brick, tile hospital, **$150,000**. Work now going ahead. CD 3/7—ENR 3/22.

Tex., Eagle Pass—Eagle Pass Ind. School Dist., Eagle Pass, project cancelled high school, **$250,000**. Work now going ahead. CD 5/5/44—ENR 5/5/44.

Tex., Galena Park (br. Houston)—Bd. Educ., Galena Park, project cancelled, high school. **$300,000**. Work now going ahead. CD 3/7—ENR 3/22.

Tex., Port Lavaca—City, F. H. Dudgeon, mayor, City Hall, project cancelled freeze or cold storage plant. **$125,000**. Work now going ahead. CD 1/23—ENR 2/8.

COMMERCIAL BUILDINGS

PROPOSED WORK

★**Calif., Beverly Hills**—E. L. Cord, c/o Coldwell, Banker & Co., 523 W. 6 St., Los Angeles, group retail stores in entire block at Wilshire Blvd. and Beverly Dr. Over **$1,000,000**.

★**Ga., Cordele**—Aged & Orphans Industrial Home of America, Inc., c/o Rev. J. B. Johnson, Cordele, bldgs., dairy farm for orphaned negro children and aged persons, incl. primary and elementary schools, vocational schools, hospital and chapel, on 400 acre site. **$2,500,000**. Site purchased

Mass., Newburyport—Immaculate Conception Parish, J. J. Mooney, pastor, 7 Court St., brick, steel elementary and high school, High St. **$250,000**. Financing not provided.

★**Mo., St. Louis**—Company, c/o A. K. Feinberg, Adolph K. Feinberg Real Estate Co., 2914 Union Blvd., Zone 15, rein.-con., brick, stone, steel hotel, 12 Blvd. between St. Charles and Locust Sts. Over **$500,000**.

★**Mo., St. Louis**—Stix, Baer & Fuller, Washington Ave. at 6 St., remodeling, enlarging mezzanine floor providing addnl. 25,000 sq. ft. space in store, incl. installing escalators, completing store-wide air-conditioning sys., installing modern equip. and furnishings in various departments. **$2,000,000**.

N. Y., New York—City Investing Co., R. W. Dowling, pres., 30 Broad St., Zone 4, apartment, on 100x111 ft. site, Madison Ave. and 91 St. Over **$150,000**.

N. Y., New York—City Investing Co., R. W. Dowling, pres., 30 Broad St., Zone 4, apartment, on 80x100 ft. site, 11 Ave. and 54 St. Over **$150,000**.

★**N. Y., Rochester**—Eastman Kodak Co., 343 State St., 14 story office bldg., over **$1,000,000**; 6 story office bldg., at Kodak Park providing dining and recreation facilities, over **$150,000**.

O., Mansfield—Trustees Memorial Bldg., Mansfield, remodel, enlarge Memorial Hall, **$250,000**.

★**Pa., Phila.**—St. Therese of The Child Jesus Catholic Parish, Rev. J. M. Toohey, rector, Vernon Rd and Ardleigh St., church and school bldg. **$500,000**. Financing provided.

Tex., Houston—H. H. Clark, W. 14 St., residences on 20-acre subdivision, sewers, water facilities. Est. **$190,000**. Financing not provided.

Tex., Houston—H. A. Kinney, 5009 Fannin St., residential development in 368 acre sub-division. Over **$150,000**. Financing not provided.

Tex., Houston—Wilfred E. Loggins, 7016 Myrtle St., 37½ acre residential development, about 14 mi. west of here, **$150,000**; 253-acre tract residential development, 18 mi. west of here on Westheimer Rd., near Alief, over **$50,000**. Financing not provided.

★**Tex., Waco**—Masonic Grand Lodge of Texas, Bascom Giles, Grand Master, Austin, grand lodge temple bldg. **$1,000,000**. Financing not provided.

Wis., Milwaukee—H. Hart, 2342 N. 3 St., Zone 12, movie theatre, **$175,000-$200,000**.

PLANS UNDER WAY

★**Calif., Beverly Hills**—Group of Sponsors, incl. Drs. J. Dow, J. P. Lordan & F. E. Brown, c/o Wm. L. Pereira, archt., 7417 Beverly Blvd., Los Angeles, preliminary plans completed, community-hospital-medical university on 20 acre site near here, incl. 14 rein.-con. bldgs., **$5,000,000**. Financing provided.

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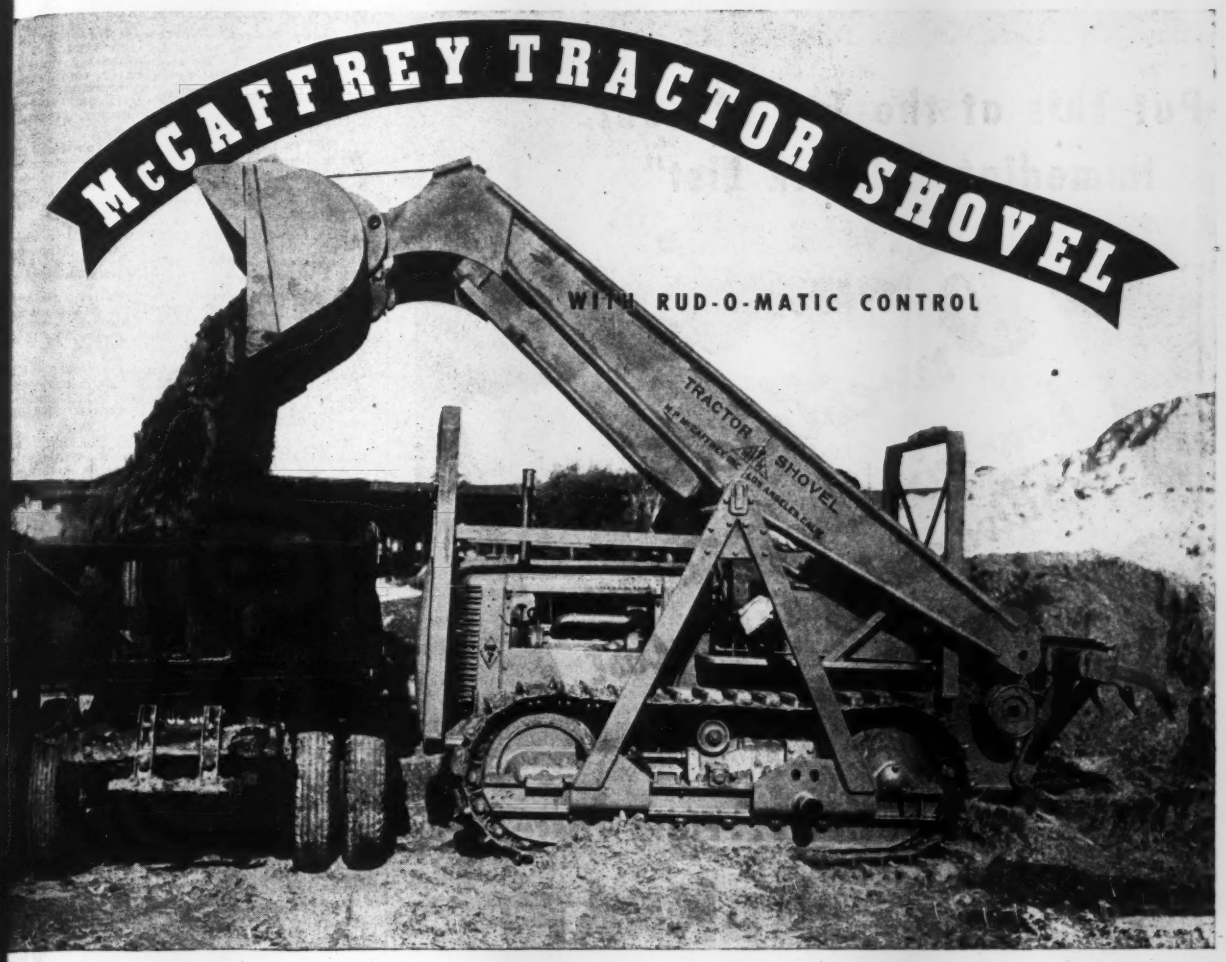
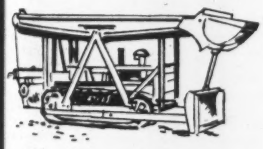
McCAFFREY TRACTOR SHOVEL

WITH RUD-O-MATIC CONTROL



With full cable control of the bucket, the load can be dumped gradually without crashing on truck bed.



Bulldozer ready for action. Shows iron bar connecting with bucket.

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100% CABLE CONTROL OF BUCKET— PERMITS GRADUAL DUMPING OF THE LOAD.

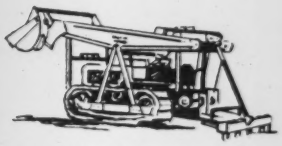
WEIGHT CENTERED ON TRACTOR FRAME—

BUCKET CAN REACH OVER CENTER OF TRUCK BEING LOADED—

RIPPER CARRIED ON MACHINE READY FOR IMMEDIATE ACTION—

LOW OVER-ALL HEIGHT FOR TRANSPORTING—

DIGS -- GRADES -- RIPS -- LOADS



Ripper in operation. Tube bar connects ripper and walking beam arm of shovel. No bolts or pins required. Also used for cowdozing.

Manufactured in sizes, ¾ yard to 1¾ yards. Photo above shows 1¼ yards capacity.

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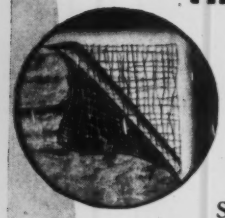

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Use Sisalkraft to cover and protect equipment against weather . . . line construction shanties . . . cover stock piles . . . for closing in . . . over sub-fills . . . over sand cushions under tarrazzo . . . to cover brick courses . . . as all-'round building protection.

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POSTWAR PROJECTS (Cont'd.)

★**Idaho, Nampa**—Northwest Nazarene College, Nampa, plans by Wayland & Fennell, 216 N. 8 St., Boise, women's dormitory, education bldg., fine arts center, auditorium, central heating plant, gymnasium bldg., recreation bldg., science hall and student union bldg., **$700,000.** Financing provided. CD 4/5—ENR 4/19.

★**Ill., Chicago**—Moody Bible Institute, 153 W. Institute Pl., preliminary plans by Fugart, Burt & Wilkenson, 520 N. Michigan Ave., 6 story, brick, stone, concrete, steel, radio-music bldg.; 3 story, auditorium bldg. **$2,000,000.**

★**Ill., Springfield**—Franklin Life Insurance Co., 800 S. 6 St., Springfield, plans by Ahlschlager & McCammon, 212 S. St. Paul St., Dallas, office, S. 6 St. **$500,000-$600,000.**

La., Shreveport — The Salley Grocery Corp., J. Salley, 409 Commerce St., plans by S. G. Wiener, City Bank Bldg., Shreveport, steel, brick grocery store opposite The U. & P. Depot. **$200,000.**

★**Mass., Boston**—Boston University, 688 Boylston St., plans by Cram & Ferguson, 248 Boylston St., college of music, Commonwealth Ave. Campus. To exceed $500,000. CD 12/8—ENR 12/28.

Mass., Brighton—Cenacle Convent, 204 Lake St., plans by Maginnis & Walsh, 128 Newbury St., Boston, 4 story, brick, steel convent addn., incl. chapel, Lake St. Financing not provided.

Mass., Cambridge—Cambridge Community Center, Inc., 49 Howard St., plans by R. Reid, 30 Bowdoin St., brick community center, **$150,000.** Financing not provided.

Mass., Springfield—Our Lady of Mt. Carmel Church, Rev. Wm. J. Ludessi, pastor, 123 Williams St., plans by A. J. DeFace, 151 W. 46 St., New York, N. Y., 2 story, bsmnt. parochial school, Margaret St. **$150,000.**

Mich., Suttons Bay—Sugar Loaf Winter Sports Club, Suttons Bay, plans under way, winter sports center, incl. ski runs, jumps, and toboggan runs, warming houses and other park bldgs. **$225,000.**

Neb., Plattsmouth — Nebraska Masonic Lodge, 19 and Farnam Sts., Omaha, plans by John Latenser & Sons, 1307 Farnam St., Omaha, Masonic Home for Aged addn. **$350,000.** Financing not provided.

★**O., Cincinnati**—Bethesda Hospital & Deaconess Assoc., 622-28 Oak St., Dr. J. Dickman, pres., Reading Rd. and Oak St., plans by S. Hannaford & Sons, Dixie Terminal Bldg., 7 story, nurses home and educational bldg., etc. **$500,000.** Financing available. CD 1/31—ENR 3/8.

O., Youngstown—Owner, c/o Joseph G. Brownlie & Associates, archts., Mahoning Bank Bldg., 6 story, bsmnt. apartment, Spring St. between Bryson and Elm Sts. **$350,000.**

Ore., Portland—Lewis & Clark College, 0615 S.W. Paltne St., plans by Stanton & Johnson, Railway Exchange Bldg., physical science bldg. **$155,000.** Financing not provided.

Ore., Portland—University of Portland, N. Willamette Blvd. and Fiske St., plans completed by F. B. Jacobberger, McKay Bldg., engineering bldg. **$300,000.** Financing not provided. CD 1/31—ENR 3/8.

Ore., Salem—Willamette University, Salem, plans completed by P. Belluschi, 2040 S.W. Jefferson St., men's dormitory. **$325,000.** Financing not provided. CD 5/5—ENR 5/11.

Pa., Phila.—F. B. Storch, 4409 Princeton Ave., plans under way, residential development, Tabor Ave. from Van Kirk St. to Comley and from Comley to Benner Sts. **$150,000.** Site purchased. Financing provided. CD 5/6—ENR 5/31.

★**Pa., Springfield**—Owner, c/o W. S. Peace, 69 and Walnut St., Upper Darby, plans completed 175-home residential development, State and Springfield Rds. **$1,700,000.** Financing not provided.

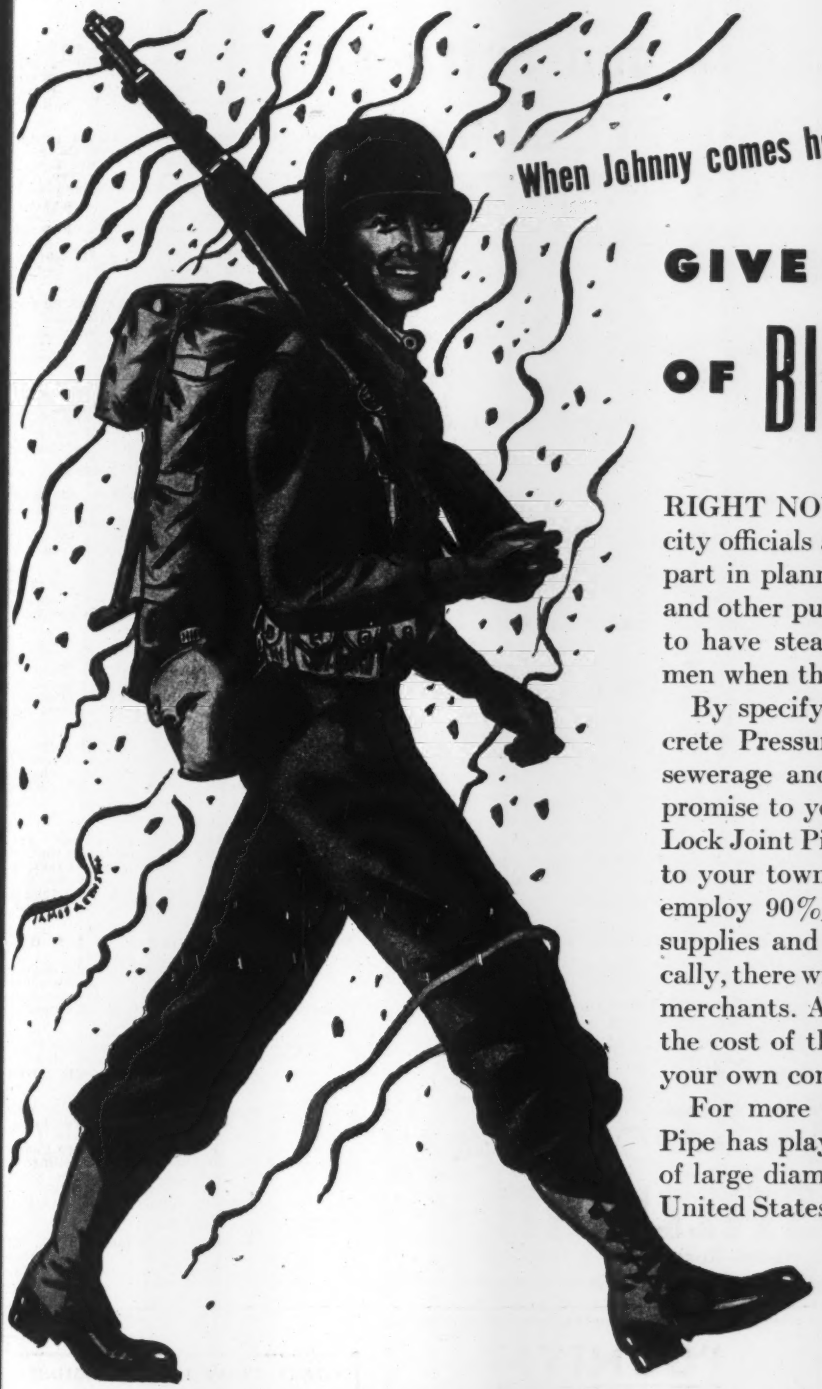
Tex., Brownwood—Howard Payne College, Brownwood, plans by W. N. Noonan, 720 Travis Bldg., San Antonio, 2 story, boys' dormitory, brick, stone, concrete, **$150,000.** Financing not provided. CD 6/1/44—ENR 6/15/44.

Tex., Dallas—Kessler Park Methodist Congregation, Colorado and Turner Sts., plans 10% completed by J. Murrell Bennett, 1st National Bank Bldg., church **$150,000.** Financing not provided. CD 8/23—ENR 9/7.

★**Tex., Dallas**—Lacy Building Corp., c/o Rogers Lacy, Longview, plans by J. D. Carsey, Lacy Bldg., and 8500 Inwood Rd., hotel, office or mercantile bldg. **$2,500,000.** Financing provided.

Tex., Dallas—J. C. Penney Co., 5415 E. Grand St., Dallas, plans 25% completed by W. W. Ahlschlager, 212 S. St., St. Paul St., 7 story, bsmnt., concrete, brick, steel department store. **$350,000.** Financing provided.

Tex., Gonzales—Gonzales Warm Springs Foundation, Gonzales, plans 50% completed by J. M. Marriott, Frost Bank Bldg., San Antonio, theatre, chapel and school bldg. **$150,000.** Financing provided.



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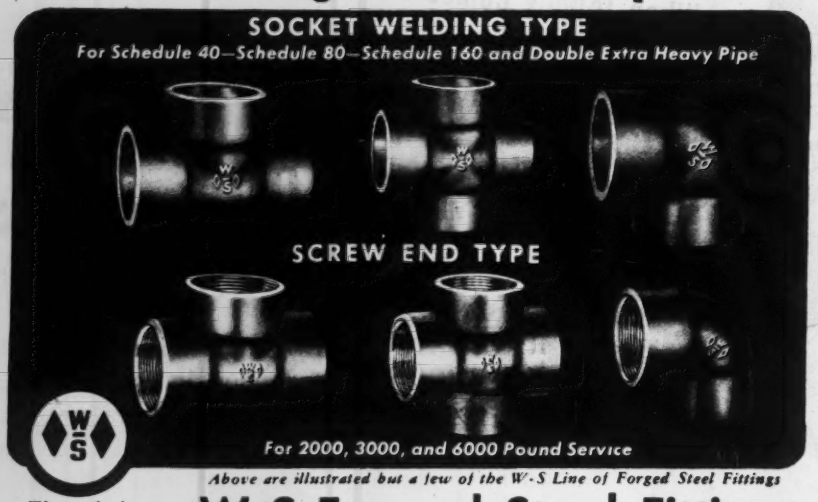
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POSTWAR PROJECTS (Cont'd.)

★**Tex., Houston**—Foley Bros., 407 Main St., plans by Kenneth Franzheim, 2306 Crawford St., 5 story, retail department store. **$1,250,000.** Financing not provided. E. E. Ashley, 10 E. 40 St., New York, N. Y., consult. engr.

★**Wash., Parkland**—Pacific Lutheran College, Parkland, Dr. S. C. Eastvold, pres., plans by Lea, Pearson & Richards, Tacoma Bldg., 5 Tacoma, 2 women's dormitory, each **$150,000**; men's dormitory, **$150,000**; common bldg., **$200,000**; reconstruct gymnasium into science bldg., **$60,000**; completion library, **$40,000**; chapel and music hall, **$150,000**; central heating plant, **$50,000**; athletic stadium, **$150,000**; landscaping **$15,000**; Financing partially provided. CD 5/7—ENR 5/17.

Wash., Seattle—Seattle Historical Society, c/o Mrs. T. Piestcheef, 814 E. Highland Dr., Zone 22, plans by P. Thiry, Skinner Bldg., 5 Ave. and Union St., Zone 1, historical museum, **$300,000.** Financing partially available.

Wash., Walla Walla—Whitman College, W. A. Anderson pres., Walla Walla, plans by Bebb & Jones, Hoge Bldg., 2 and Cherry Sts., Seattle, Zone 4, student union bldg., **$60,000**; library, **$150,000**; girls dormitory, **$100,000**; 5 other unspecified bldgs. Financing partially available. CD 4/13—ENR 5/3.

Wis., Burlington—Burlington Memorial Hospital, Burlington, plans completed by G. J. deGelleke, 152 W. Wisconsin Ave., Milwaukee, Zone 3, 2 story hospital addn. **$150,000.** Financing not provided. CD 5/2—ENR 5/17.

Wis., Racine—Lutheran High School Assn., 2917 Olive St., plans by F. J. Hoffman, 201 6 St., 2 story high school, **$200,000.** Financing not provided.

READY FOR BIDS

Conn., Southington—Bradley Memorial Hospital, Meriden Ave., plans completed by W. Wilkins, 648 Asylum Ave., Hartford, hospital addn. **$250,000.** Financing provided. CD 2/27—ENR 3/8.

Tex., San Angelo—First Methodist Church, San Angelo, plans completed by M. Lemmon, Tower Petroleum Bldg., Dallas, church. **$200,000.** Financing provided. CD 3/16—ENR 4/5.

CONTRACTS AWARDED

★**Calif., Los Angeles**—Broadway Dpt. Store, 401 S. Bway., 3 story, rein.-con. department store, on 35 acre site, Crenshaw Blvd. between Stocker Ave. and Santa Barbara Blvd., to C. L. Pack, H. W. Hellman Bldg., approx. **$1,500,000.** A. B. Cardner, 408 S. Spring St., archt.

Mo., Clayton (St. Louis, Zone 5 P. O.)—Jacob L. Rubin & Son, et al, 105 N. 7 St., St. Louis, Zone 1, will construct several ranch-type residences with attached garages, sewer and water facilities, on 48-acre tract in subdivision known as Clayton Gardens II, by own forces. Over **$150,000.**

R. I., Pawtucket—E. W. Taylor, 844 Broad St., Providence, 50 frame residential development. Owner builds. **$260,000.** CD 2/17/44—ENR 3/9/44.

★**Tex., Houston**—Hill P. White & Associates, 3430 Leeland St., 315 dwellings on 75-acre site off Telephone Rd., to C. B. Faulkner and W. F. Wisdon, c/o Reo Constr. Co., West Bldg., **$1,750,000**; 500 dwellings on 130 acre tract adjacent Highlands addn., near Pasadena, to Houck Realty Co., Pasadena, **$2,250,000.** CD 5/14—ENR 5/31.

PROJECTS CANCELLED

Tex., San Antonio—Kallisons, et al., 124 S. Flores St., project cancelled, converting 8 story office bldg. into apartment hotel, etc., **$150,000.** CD 3/16/44—ENR 4/6/44.

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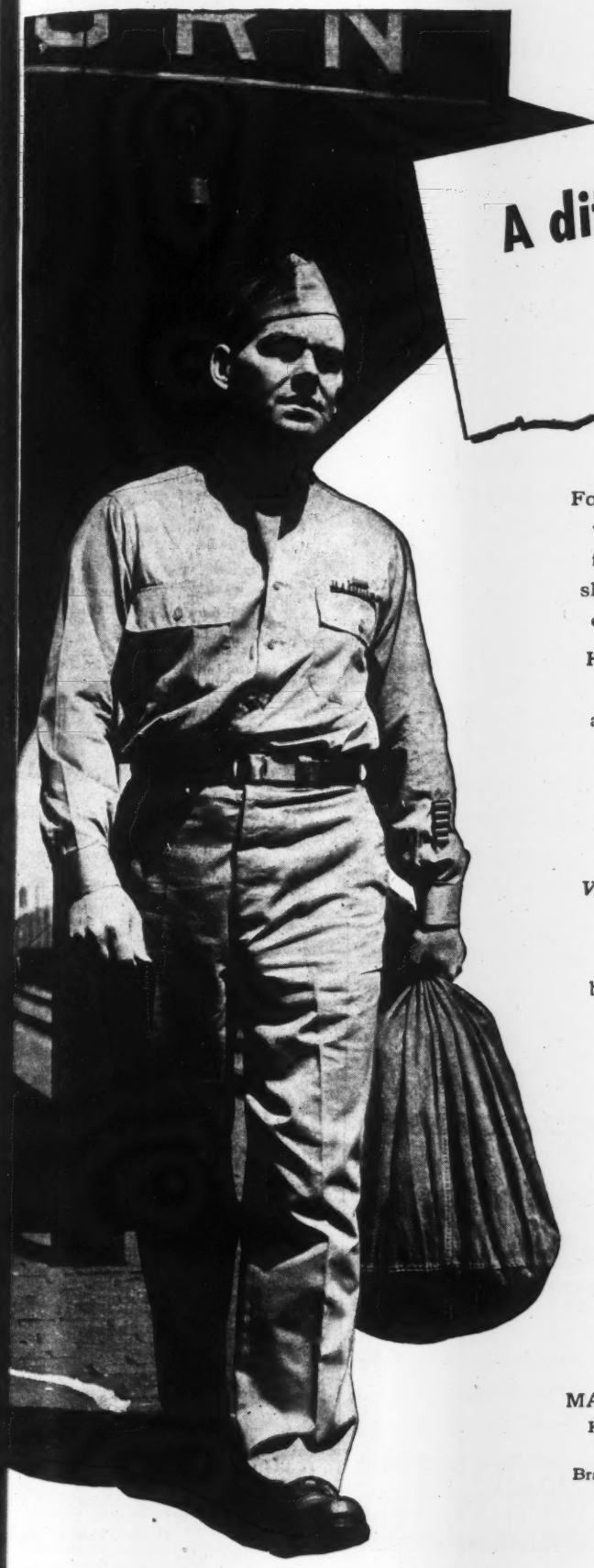

A different Johnny is marching home

For one thing, he won't parade up Main Street the way you always expected. He doesn't much care for the ticker tape and bunting. By day coach or sleeper, Johnny is coming home with the experiences of battle vivid in his memory.

He may be back for the job he left when the call to colors came. You know you'll be proud and happy to have him with you.

But it's a *different* Johnny. Not quite the happy-go-careless guy you knew before. He's older for one thing. More thoughtful. You may even find him brusque or restless now and then.

Why?

When a man's been through the hell and pandemonium of battle . . . or the terrible boredom of lonely, inactive outposts, it's hard to readjust to a paradise of peace and plenty. It will take Johnny time to settle in a civilian groove, and the call's on you for friendly tact and patience.

Pull with Johnny. Give him time to come through at home, as he came through on the fighting front. Play ball with Johnny. He made a swell soldier. And he's going to make a swell civilian.

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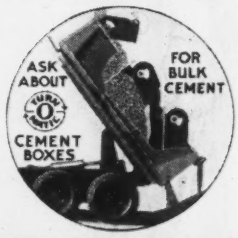

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INDUSTRIAL BUILDINGS

PROPOSED WORK

Calif., Delano—WINERY—Delano Growers Cooperative Winery, Delano, will addn., increasing capacity by $80,000 gal. $100,000.

Conn., New Haven—WAREHOUSE, etc.—Colonial Beacon Oil Co., 378 Stuart St., Boston, Mass., 1 story, 40 x 75 x 181 ft., brick concrete warehouse and garage, East Shore Parkway, $40,000.

Minn., Fridley (mail Minneapolis)—PLANTS—J. R. Clark Co., 2 and Aldrich Aves. N., Minneapolis, metal working plant, $150,000.

★ **Minn., Minneapolis**—PRINTING PLANT, etc.—Jensen Printing Co., C. H. Jensen, pres., 114 N. 3 St., 2 story printing plant and office bldg. $500,000.

Minn., Minneapolis—MILL AND WAREHOUSE—Ralston Purina Co., 3831 Hiawatha Ave., mill and warehouse addn. to plant, $75,000.

Minn., St. Paul—BAKERY—Paramount Baking Co., J. A. Boulay, secy., 614 Cromwell Ave., bakery, Myrtle St. and Wabash Ave. $175,000.

Minn., St. Paul—GARAGE, etc.—Motor Transfer Co., 198 E. 9 St., terminal garage and office bldg., Charles Ave. near Pierce Ave. $125,000.

★ **Mo., Independence** — PLANT — General Motors Corp., c/o C. E. Wilson, pres., General Motors Bldg., Detroit, Mich., assembly plant, on 317 acre site, north of Lake City Ordnance Plant, near here, Jackson Co.

Mo., St. Louis—FACTORY—Northwestern Cooperage Co., 1542 N. Tenth St., Zone 6, brick, concrete factory, on 3700 block North Bway. through to Second St. $100,000 with equip. Site purchased.

N. Y., Binghamton — FACTORY — Robert Gair Co., Inc., 155 E. 44 St., New York, Zone 17, factory, mfg. corrugated products, Grand St. Over $40,000. Site acquired.

★ **S. C., Goldville**—PLANT—Joanna Textile Mills, Goldville, plant expan. $500,000 incl. equip.

Vt., Montpelier—GARAGE—H. M. Farnham & Sons, 50 Court St., concrete, brick, steel garage. To exceed $40,000.

★ **Ont., Cornwall** — MILL — Courtaulds (Canada), Ltd., S. Dixon, pres., Cornwall, mill mfg. staple fibre. About $5,000,000.

PLANS UNDER WAY

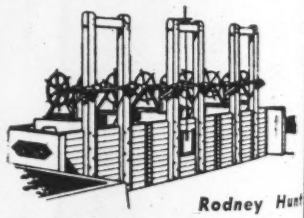
★ **Calif., Los Angeles**—PICTURE STUDIO—Owner, c/o Wm. L. Pereira, archt., 7[illegible] Beverly Blvd., rein.-con., motion picture production studio, incl. 20 sound stages, bldgs. $9,000,000.

Conn., Meriden—SHOP, etc.—G. R. Cummings Roofing Co., 198 State St., plans completed 1 story, bsmnt., brick, steel, concrete shop and office addn. $40,000. L. Caproni, 1221 Chapel St., New Haven, consult. engr.

★ **Ga., Atlanta** — PLANT — Owens-Illinois Glass Co., Ohio Bldg., Toledo, O., plans 33 1/3% completed 1 and 2 story bottle mfg. plant on 80 acre site south of here, on Central of Georgia RR one-half mi. from Candler Airport, $2,000,000 or more. R. Cosh, owner, Alton, Ill., engr.

★ **Ga., Hapeville**—PLANT—Ford Motor Co., 3000 Schaefer Rd., Dearborn, Mich., plans 50% completed assembly plant and parts depot on 82-acre plot. $3,000,000. CD [illegible]

Ga., Lawrenceville — FACTORY — General Shoe Corp., C. W. Butler, pres., 1251 Carroll St., N.E., Atlanta, plans under way factory addn. $50,000. Robert & Co., Bona Allen Bldg., Atlanta, consult. engrs.



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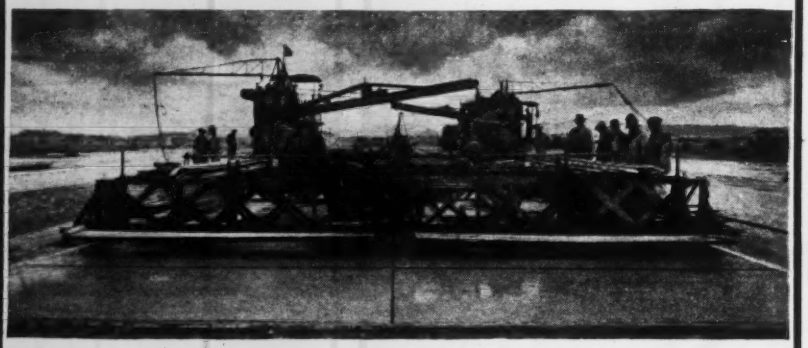

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POSTWAR PROJECTS (Cont'd.)

★**N. Y., Schenectady** — LABORATORY — General Electric Co., River Rd., plans by Voorhees, Walker, Foley & Smith, 101 Park Ave., New York, Zone 17, research laboratory on 219 acre plot at Niskayuna, 5 mi. east of here. **$8,000,000.**

Tex., Dallas—PLANT—Pure Ice & Cold Storage Co., c/o F. A. Kadane, 906 S. Harwood St., plans 50% completed plant imprvs., expan. Over **$75,000.** Financing provided.

★**Tex., Garland**—PLANT—Luscombe Aircraft Co., Bear Tavern Rd., Trenton, N. J., plans 25% completed aircraft mfg. plant, **$500,000.** Financing provided. CD 3/9—ENR 4/5.

READY FOR BIDS

Conn., Stamford—AUTO SERVICE—Ford Sales & Service Co., J. Kelly, mgr., 161 Main St., plans completed by F. Urson, 27 West Park Pl., 1 story, 100 x 170 ft. auto service bldg., South and Guernsey Sts. Over **$40,000.** Financing available. CD 5/24—ENR 10/5.

N. H., Laconia—WAREHOUSE—R. Smith, 58 Gale Ave., plans completed by N. P. Randlett, 614 Main St., Laconia, 1 story, bsmnt., 60 x 100 ft., frame, steel warehouse, **$15,000.** Financing provided.

★**Tex., Dallas**—SERVICE SHOP, etc.—Alexander Motor Co., 2121 Pacific Ave., plans completed by J. A. Pitzinger, Southland Life Bldg., 1 story, 260x700 ft., brick, steel, rein.-con. auto sales and mechanical service shop bldg. **$500,000.** Financing provided. CD 4/12/44—ENR 4/20/44.

CONTRACTS AWARDED

N. Y., New York—WAREHOUSE—U. S. Plywood Corp., 55 W. 44 St., Zone 18, warehouse, 144 St. and Southern Blvd., to Chas. Herman Constr. Co., Inc., 364 W. 34 St., Zone 1. Est. **$170,000.** F. Parker, 533 W. 57 St., Zone 19, archts.

UNCLASSIFIED

PROPOSED WORK

Mass., Millville — MEMORIAL PARK — Bd. Selectmen, Town Hall, memorial park. To exceed **$25,000.** Site purchased.

Mass., Somerville—STADIUM—City Hall, preliminary plans under way concrete, brick, steel stadium at Richard Trum Field. To exceed **$50,000.**

New York — PARK IMPROVEMENTS — Dpt. P. Wks., State Office Bldg., Albany, Zone 1, imprv. facilities, replacing structures at Crown Point Reservation, Essex Co., for Div. Parks, Conservation Dpt. **$43,500.**

★**N. Y., Binghamton**—AIRPORT— Comrs. Broome Co., Binghamton, airport, **$1,200,000.** State Aid Planning Funds allotted.

N. Y., Fonda—CRUSHER BINS, etc.—Comrs. Montgomery Co., Fonda, crusher bins and pug mill at County Quarry, **$36,000.** State Aid Planning Funds allotted.

N. Y., Rome—PARKS & PLAYGROUNDS—City, City Hall, imprv. parks and playgrounds, **$61,000.** State Aid Planning Funds allotted.

N. Y., Saratoga Springs—BROOK IMPROVEMENTS—City, Village Brook imprvs. **$188,000.** State Aid Planning Funds allotted.

Tex., Cockrell Hill (mail Dallas)—STREET LIGHTING SYSTEM—City, 1014 Sunnyside St., street lighting sys. **$25,000.** Financing not provided.

★**Tex., Houston**—DOCKS—Houston Navigation Dist., J. Russell Wait, dir. Port Courthouse, Houston, dock construction program, incl. rehabilitation Docks 1 and 2, constructing 600 ft. Dock 9. **$1,000,000.**

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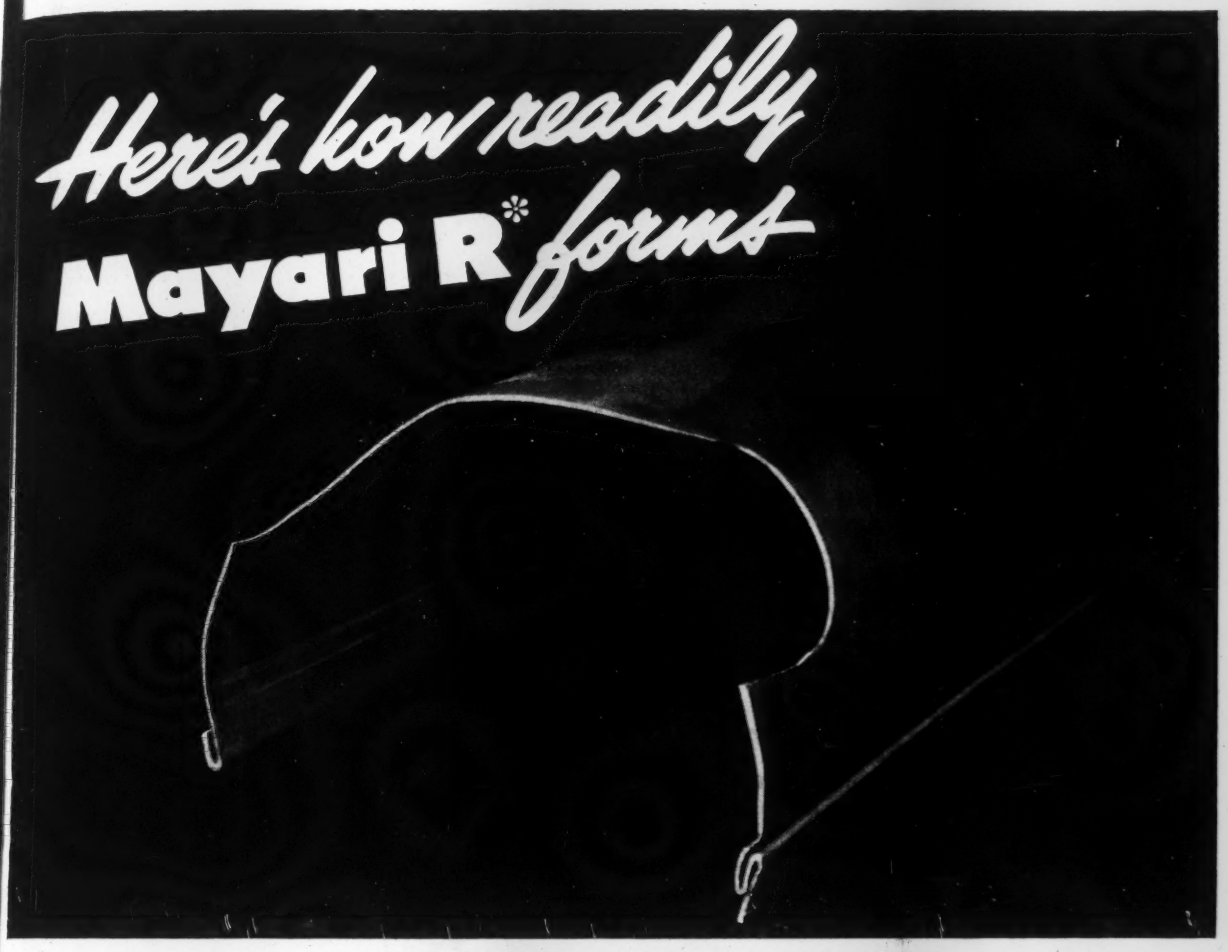

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*"We believe that we can find many uses for Mayari R in products we make."***

That gives you an idea of how readily sheets of Mayari R are formed. It also comes in strip, plates, bars and shapes, and in all forms it is readily fabricated under ordinary shop practices. It welds exceptionally well, too, by all the usual methods—and does not tend to air-harden, hence needs no heat treatment. With Mayari R, then, you have shop costs comparable to those with mild carbon steel.

Its workability, combined with its superior strength and corrosion-resistance, makes Mayari R well worth thinking about for your postwar products. With a yield point nearly twice that of mild carbon steel, Mayari R makes possible stronger construction with lighter sections—possible reductions in deadweight up to 40 per cent. And you get high resistance to atmospheric corrosion—five to six times that of mild carbon, and two to four times that of copper-bearing steel.

**Name of the concern that made this test and report supplied on request.

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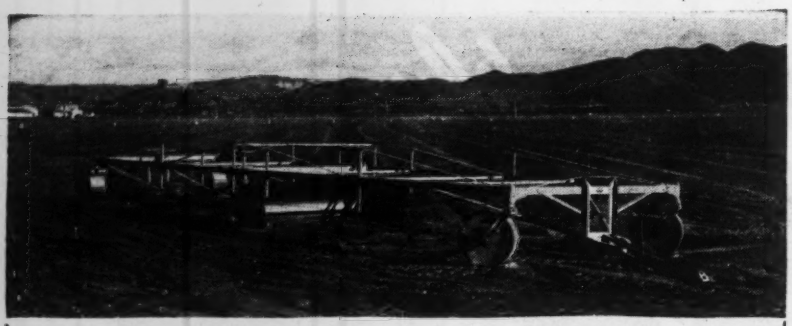
Mayari R *makes it lighter... stronger... longer lasting*



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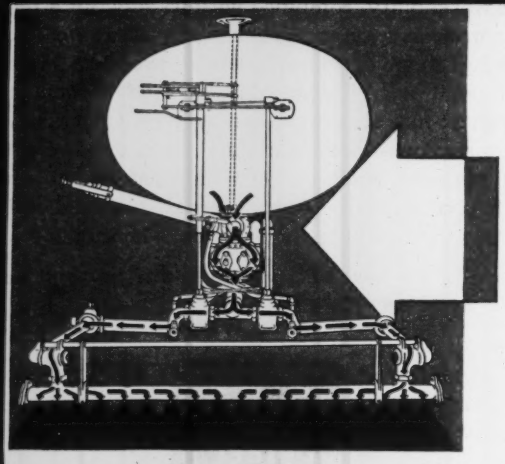

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LEAKPROOF... no pipe fittings. Service any part without disturbing remainder of system.

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POSTWAR PROJECTS (Cont'd.)

Wash., Pasco—OIL TERMINAL. Port of Pasco, Pasco, completing oil terminal by addn. of four 500,000 gal. storage tanks, **$90,000.** Financing provided.

Wis., Racine — TENNIS COURTS — Bd. Educ., City Hall., A. W., Schafer, secy., tennis courts, **$25,000.**

PLANS UNDER WAY

★**Calif., Long Beach**—STADIUM—Chamber of Commerce, Long Beach, preliminary plans by H. Gibbs, 441 E. First St., 441x652 ft. sports stadium. **$500,000.**

Colo., Colorado Springs—AIRPORT BLDG.—City, City Hall, administration bldg., municipal airport, **$50,000.** Financing provided. F. O. Ray, City Hall, city engr.

★**Colo., Colorado Springs**—SPRAY POND, etc.—City, City Hall, 6 year program, concrete spray pond at steam plant, extend gas mains, underground electric distr. sys. and miscellaneous imprvs. **$771,000.** Financing provided. F. H. Wiley, Utilities Bldg., engr.

Colo., Colorado Springs — SWIMMING POOL—City, City Hall, 6 year program, swimming pool, shelter and miscellaneous imprvs. in various parks and golf club, **$313,000.** Financing provided. F. O. Ray, City Hall, city engr.

★**Fla., Jacksonville**—RECREATION CENTER—City, City Hall, Master Memorial Recreation Center, consisting yacht basin, auditorium, swimming pool, baseball park, tennis and badminton courts, administration bldg., etc., between approaches to St. Johns Bridge and Main St. Bridge. **$1,500,000.** Financing arranged. W. E. Sheddon, Engineers Bldg., city engr.

Idaho, Lewiston — SWIMMING POOL—City, City Hall, plans completed concrete swimming pool in Vollmer Park. **$35,000.** Financing not provided. W. P. Hughes, City Hall, city engr.

Ore., Woodburn—City, City Hall, plans by Annand & Kennedy, Central Bldg., Portland, 60 x 120 ft., concrete swimming pool with locker house, **$40,000.** Financing not provided.

R. I., Woonsocket—SWIMMING POOLS—City, Dpt. P. Wks., Woonsocket, altering 2 pools Globe Park and Dunn Memorial Park, new pools Bernor and Cass Ponds, 4 comfort stations. Over **$25,000.** Financing not provided. W. Boillazeon, Dpt. P. Wks., Woonsocket, engr.

Tex., Denton—LIGHTING SYSTEM—City, City Hall, plans 25% completed imprv. expan. street lighting sys. **$100,000** bond election June 12. J. E. Ward, Harvey-Snider Bldg., Wichita Falls, consult. engr.

Tex., Paris—PARKS, etc.—J. W. Barnes, mayor, City Hall, preliminary plans under way parks and playgrounds, **$50,000.** Financing provided. Freese & Nichols, Capps Bldg., Fort Worth, consult. engrs. W. Hicks, City Hall, city engr. CD 3/5—ENR 3/22.

Wash., Bellingham—PORT AREA ENLARGEMENT—Port of Bellingham, H. F. Isler, mgr., Bellingham, plans under way enlarging port area, **$110,000;** 10-acre fill for storage, **$30,000;** fishing boat harbor, **$45,000;** small boat harbor, **$20,000.** Financing not provided.

Wash., Port Townsend—RECREATIONAL CENTER, etc.—City, City Hall, plans under way recreational center, **$46,500;** street lighting sys., **$5,700,** concrete seawall along Water St., **$22,500.** Financing not provided. J. T. Lay, City Hall, city engr.

Wash., Renton—ATHLETIC FIELD, etc.—School Dist. 403, P. O. Box 359, plans by W. A. Mallis, Lyon Bldg., 3 and James Sts., Seattle, Zone 4, athletic field and grandstand, **$45,000.** Financing provided.

Wash., Tacoma—STADIUM—Tacoma Public Schools, P.O. Box 1357, Zone 1, plans by Mock & Morrison, consult. archts., Perkins Bldg., completing Lincoln Bowl athletic stadium, **$190,000.** Financing provided.

READY FOR BIDS

Conn., Middletown—STADIUM, etc.—City, Supt. Schools, 251 Court St., plans completed by G. F. Lamb, 121 Clover St., stadium, fieldhouse, rest room and first aid rooms, Woodrow Wilson High School. **$25,000.** Financing provided. CD 4/25—ENR 5/3.

Conn., Hartford—COMFORT STATION, etc.—City, Municipal Bldg., 550 Main St., plans completed by R. F. Barker, 17 Staples Pl., West Hartford, comfort station and bathing pavilion, incl. service bldg., grandstand, Keney Park, **$50,000;** brick bathhouses, Batterson Park, **$35,000.** Financing provided. CD 1/2—ENR 1/11.

Ia., Iowa City—SWIMMING POOL—City, City Hall, plans completed swimming pool, **$65,000.** Financing provided. Howard R. Green Co., 208-210 Bever Bldg., Cedar Rapids, consult. engr. CD 2/3/44—ENR 2/24/44.

CONSTRUCTION REPORTS

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WATER SUPPLY

POSED WORK

alif., Long Beach—City, City Hall, re-ed May 31 bids unopened, 23,500 lin. ft. n. steel watermain to extend Metropolitan ter Dist. lines. $300,000. Plans deposit Will readvertise. G. E. Baker, City Hall, engr. CD 5/23—7NR 5/31.

Y., Binghamton—Bd. Contr. & Supply, icipal Bldg., bids soon pump house super-cture. $30,000.

re., Portland—Westslope Water Dist., S.W. Canyon Rd., soon lets contract g. covered concrete reservoir, $35,000. ingham & Associates, Spalding Bldg., rs. CD 3/22.

., Phila.—Wilson-Martin Co., Swanson nd Snyder Ave., soon lets contract pump se. Over $15,000.

x., Austin—City, water lines, facilities. $15,000.

x., Kingsville—J. A. Cypher, mayor, Hall, water imprvs., incl. water wells, p house, booster pumps and 2 chlorina-$46,190. Applied for FWA funds. ilfoy & Patterson, Kingsville, engrs.

ash., Tracyton — Tracyton Water Dist., cyton, E. B. Lent, comr., water sys. ing 100 homes, $65,000. C. C. Casad, 11 St., Bremerton, engr.

S ASKED

Bids Asked After June 10

ex., Frankston—City, R. Perry, mayor, er and utility extens. $20,250. Koch & ier, Gr. Natl. Life Bldg., Dallas, engrs. 5/9—ENR 5/17.

Bids Asked June 21

is., Oconto — Oconto Utility Comn., nto. pump. sta., tank, etc., addn. to ago St. Pump. Sta., bldg for housing ison St. well and pump, erect 150,000 elevated steel storage tank, etc. McMa-Engrg. Co., Menasha, engr.

Bids Asked June 22

V. Va., Cowan—Town, at office of G. E. hur, mayor, and C. L. Henderson, Town r., Town Hall, WW sys., consisting p. plant, storage tank, distr. sys., fire tection, appurtenances. Plans deposit $5. R. Hinkle, Parsons, engr.

Bids Asked June 23

Tex., Sweetwater — City, A. C. Hoppe, r. Sweetwater, Contr. 2, water imprvs., 41-711-N. Plans deposit $15. H. N. erts, 2415 20 St., Lubbock, engr. CD 6/2 NR 5/10.

Bids Asked June 28

Md., Fort Washington—Veterans Admin., rmont Ave. between H and I Sts. N.W., sh. 25, D. C., repairing, painting water ks and towers, Proj. 2534.

Bids Asked

Okla., Chickasha—U. S. Eng., 231 W. Main Denison, water imprvs., incl. 200000 gal., -con. storage pump. unit, Ser. 34-066-57, for Borden General Hospital, $100,000.

W BIDDERS

Ark., North Little Rock — Veterans min., Vermont Ave. between H and I N.W., Wash. 25, D. C., June 5, concrete er reservoir, Proj. 2400, from H. J. Hap-Co., Muskogee, Okla., **$66,886.** CD 5/25 NR 5/31.

Calif., Santa Barbara—U. S. Eng., S. ueroa St., Los Angeles, Zone 55, May 31, nl. water supply sys., at Hoff General spital, No. 318, from Wonderly Constr. Co., 4 Lime Ave., Long Beach, **$44,264.**

Calif., San Diego—City, Civic Center Bldg., ft., 34½ in. steel cylinder, mortar-lined coated pipe 30 St. pipeline for water ply from American Pipe & Constr. Co., Firestone Blv., South Gate, **$20,574.**

Ill., Evergreen Park—Village of Evergreen rk. Evergreen Park, June 4, watermains pump house, from Ranieri Co., Box 11, rton Grove, **$18,893.** Consoer, Townsend Assoc., 211 W. Wacker Dr., Chicago, engrs.

Mass., Kingston (br. Plymouth) — Town, Water Comrs., Town Hall, June 7, er supply lines addns., from G. Wyner, Pierce St., Malden, asbestos cement pipe. 983. CD 5/25—ENR 5/31.

NTRACTS AWARDED

Ala., Tuscaloosa—U. S. Eng., Grant St. r of Westwood St., Mobile, Zone 7, er supply sys. addn., for Northington eral Hospital, Inv. 01-076-45-344 to Chi-o Bridge & Iron Co., 1800 58 St. N., Birm-ham, **$31,111.** Bids 5/17. CD 5/11.

Location of ENR Correspondents

Symbols and Abbreviations Include:

† Federal Government
★ Project of $500,000 or over
ENR Engineering News-Record
CD Engineering News-Record Construction Daily

Projects—By Size

Construction projects here reported cover the United States and Canada, are of these minimum sizes or larger: water supply, earthwork, waterworks, $15,000; other public works, $25,000; industrial buildings, $40,000; other buildings, $150,000.

Classes of Construction

(Name in order of Listing)

Water Supply
Sewers, Waste Disposal
Bridges
Streets & Roads
Earthwork, Waterways
Latin America
Public Buildings
Commercial Buildings
Industrial Buildings
Unclassified

Stages Reported

PROPOSED: (except Streets & Roads);
BIDS ASKED (new announcements only). For full calendar, see also preceding issues of ENR);
LOW BIDDERS: On jobs below $500,000 value all low bidder news will be the final reports published on the projects involved except where award is not made to the low bidder. In this case, a supplementary contract award report will be published.
CONTRACTS AWARDED: Except awards to low bidders previously reported in low bidder stage.

Dates shown are of issue in which last previous report was published.

Calif., Oakland—East Bay Municipal Utility Dist., 512 16 St., furnishing, installing miscellaneous equip. and installing other equip. at Bixler Pump. Plant Proj., Spec. 64, to Abbett Electric Co., 472 Tehama St., San Francisco, **$67,520.** J. S. Longwell, 512 16 St., ch. engr. CD 5/10—ENR 5/17.

Me., Waterville—Bd. Trustees, Kennebec Water Dist., Waterville, 26,000 ft. 16 in. c.i. watermain, Winslow to Vassalboro, to Camillo Profenno Co., 25 Free St. Est. **$100,000.** CD 3/16—ENR 3/22.

†Minn., Minneapolis—Yards & Docks, Navy Dpt., 18 St. and Constitution Ave. N.W., Wash. 25, D. C., alterations, addns. to water supply and fire protection facilities, Naval Air Station, NOY 10397, to J. McClure Kelly & Co., 89 S. 11 St., **$22,778.**

†O., Cambridge—U. S. Eng., 925 New Federal Bldg., Pittsburgh, Pa., concrete water tank, installing pump. Fletcher General Hospital, Contr. W-36-058-eng-1356, to R. J. Platten Concrete Contg. Co., Scranton and W. 25 St., Cleveland, **$15,000.**

Ore., Lebanon—Mountain States Power Co., Lebanon, 12 in. main from Elmore to A Sts. on Main St., west on A to 5 St. and north on 5 to Sherman Sts., 8 in. main from Elmore St. south on Main to Milton Sts., 6 in. main from Main St. east on Milton to Franklin Sts., installing 1,500 gpm pump, to D. Herder, Lebanon, **$36,120.**

Ore., Medford—City, City Hall, concrete reservoir, to Adler Constr. Co., 3416 W. Smith St., Seattle 9, Wash., **$140,800.** Bids 5/21, awarded 6/2. CD 6/6, under LB.

Wis., New Richmond—City, Anna Halvorson, clk., well, to Keys Well Drilling Co., 415 N. Lexington Parkway, St. Paul, Minn., **$15,847.** Bids 5/31. Banister Engrg. Co., 490 N. Snelling Ave., St. Paul, Minn., engrs.

†W. Va., Point Pleasant—Yards & Docks, Navy Dpt., 18 St. and Constitution Ave. N.W., Wash. 25, D. C., fire and fresh water distr. tank, N.M.R.C., NOY 11846, to Pittsburgh-Des Moines Steel Co., Neville Island, Pittsburgh, Pa., **$15,800.**

Wis., Wisconsin Rapids—Waterworks & Lighting Comn., F. L. Steib, mgr., Wisconsin Rapids, WW transmission sys., to L. Kispert, Green Bay, **$23,096*****pipe materials, to Johns-Manville Sales Corp., 757 N. Bway., Milwaukee, Zoe 2, **$49,148*****feeder sys., to Baker Const. Co., 2204 S. 10 St., Manitowoc, **$23,735*****c.i. pipe, to James B. Clow & Sons, 201 N. Talman Sta., Chicago, Ill., **$26,000.** Grand total $121,979. Bids 5/29. CD 5/15—ENR 5/17.

SEWERS, WASTE DISPOSAL

PROPOSED WORK

Calif., San Francisco—Dpt. P. Wks., City Hall, rejected May 16 bids, sewer in Hampshire St. between 25 and Army Sts. (Potrero Ave. Sewer), J. J. Casey, City Hall, city engr. CD 5/22—ENR 5/24, under LB.

Conn., Winsted — City, J. W. Darcey, mayor, City Hall, making preliminary studies and survey drainage sys., grading Cottage and Oak St. Section. Over $25,000. E. Keefe, City Hall, engr.

Tex., Austin—City, City Hall, sanitary sewer lines. $25,000.

BIDS ASKED

Bids Asked June 19

†Va., Hampton—Federal Works Agency, 18 and F Sts. N.W., Wash. 25, D. C., exten. Hampton trunk sewers., Div. I, J. K & L.

Bids Asked June 25

Fla., DeLand—E. M. Beardslee, city mgr., City Hall, emergency sewage treatment plant, incl. 3 sewage pumps, primary clarifier mechanism for circular tank only; adv. ENR 6/14.

Bids Asked June 26

Calif., Los Angeles — Bd. Superv., Los Angeles Co., 10,344 ft. 6 and 8 in. vitr. clay sanitary sewers, Daphine St., C. I. No. 1103, $27,700; 4.32 mi. sanitary sewer, Clara St., et al, C. I. 1087, $98,700. A. Jones, Hall of Records, engr.

LOW BIDDERS

Calif., Long Beach—City, City Hall, May 31, sanitary sewer interceptor in alley north of 2 St., Park to Claremont Aves., Spec. 4-1432, from M. Mikcevich, 1540 McDonald Ave., Wilmington, **$29,069.** G. E. Baker, City Hall, city engr.

Calif., Long Beach—City, City Hall, June 5, storm drain in Willow St., Pico to Santa Fe Aves., from Burch & Bebek, 8093 S. Bway., Los Angeles, **$28,855.** Est. $25,000. CD 5/9—ENR 5/17.

Calif., Los Angeles—Bd. Supervs., Los Angeles Co., Hall of Records, June 5, vitr. clay sewer in Motz and other streets, under C.I. 1098, from Martin Constr. Co., 408 Spring St., **$34,787.** A. Jones, Hall of Records, engr.

Calif., San Francisco—Dpt. P. Wks., City Hall, constructing LaPlaya Sewer (West Sunset System-Sect. C), in Great Highway, lower road from Lincoln Way to Lawton St., from Healy Tibbitts Constr. Co., 1199 Evans Ave., **$79,283.** J. J. Casey, City Hall, city engr.

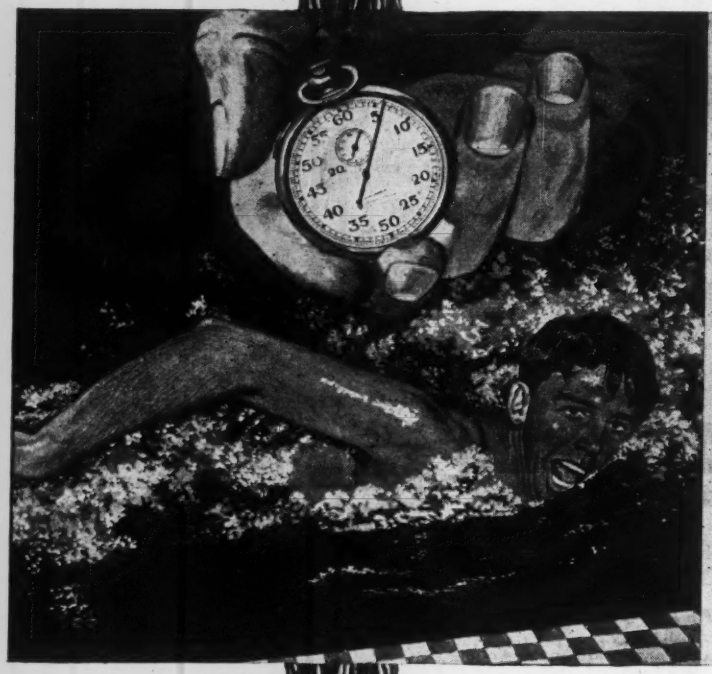
Calif., South San Francisco—City, City Hall, June 4, outfall sewer, from McGuire & Hester, 796 66 Ave., Oakland, **$130,439.** Chas. T. Broughton, South San Francisco, works engr.

CONTRACTS AWARDED

Tex., Weslaco—City, 6 to 10 in. vitr. tile collection sanitary sewer imprvs., 2 lift pump stations, etc., to Shuford & Yuder, Post Office Bldg., approx. **$27,725.** Bids May 15. CD 4/27—ENR 5/3.

Que., Kenogami—City, R. Conlombe, secy., sewer and water extens., etc., to Pic Constr. Co. Ltd., Arvida, about **$100,000.** CD 1/19—ENR 1/25.

J&L PERMASET PRECISIONBILT PRE-FORMED WIRE ROP



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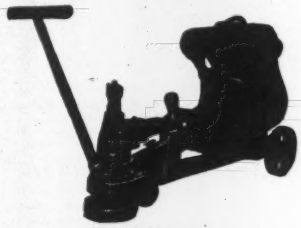

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BRIDGES

PROPOSED WORK

★**La., Lake Charles**—Dpt. Hys., Baton Rouge, bids soon constructing northern approach to Calcasieu River Bridge. $12,500,000.

New Jersey—State Hy. Dpt., Trenton, rebuilding Brigantine Bridge, incl. two 400 ft. sections connecting with central draw section of bridge, Atlantic Co. $300,000.

BIDS ASKED

Bids Asked June 20

Louisiana—State Hy. Dpt., Baton Rouge, 0.011 mi. 6 ft. rein.-con., canal culvert on Houma Race-Land Hy., State Route 2, Terrebonne Parish. Plans deposit $2.50.

Bids Asked June 29

Tennessee — State Hy. Dpt., Nashville, bridge, approaches 0.075 mi. State Hy. 52, approx. 5.4 mi. west of Jamestown S.A.P. 366-1, Fentress Co.; reconstructing bridge over French Broad River on State Hy. 35, approx. 1 mi. northeast of city limits of Newport, S.A.P. 593-B, Cocke Co.

LOW BIDDERS

Louisiana—State Dpt. Hys., Baton Rouge, June 6, Twelve Mile Bayou Bridge (Twin Moorings Ferry), S.P. 78-02-01, Caddo Parish, from W. R. Aldrich & Co., Kalwrah University Gardens, Baton Rouge, **$70,783.** CD 5/22—ENR 5/24.

Massachusetts—Commonwealth of Massachusetts, Dpt. P. Wks., Boston, June 5, bridge, approaches over Connecticut River, Agawam and West Springfield, Proj. SPW-FAP 136-D(1), from Daniel O'Connell's Sons, Inc., 480 Hampden St., Holyoke, **$203,577.** CD 5/23—ENR 5/31.

Texas—State Hy. Dpt., Austin, June 7, repairing Brazos River Bridge, Robertson Co., from Southern Contg. Co., 1901 Meadowbrook St., Austin, **$52,500.**

STREETS AND ROADS

BIDS ASKED

Bids Asked June 19

Indiana—State Hy. Comn., J. H. Lauer, chn., Indianapolis, rein.-con. pavement and resurfacing 5.617 mi. State Rd. 24 from New Haven northeast, Rd. Contr. 2328, Allen Co. Plans deposit $5.75. C. E. Vogelsang, c/o owner, engr.

North Carolina—State Hy. & P. Wks. Comn., Raleigh, bituminous retreatment 26.2 mi. road from Bellemont to Randolph Co. line on N. C. Rt. 49 and from end of concrete pavement south of Graham to Chatham Co. line, N. C. Rt. 87, Betterment Sect. 5-6-42-131, Alamance Co., $50,000-$75,000; 27.8 mi. road from U. S. Rt. 421 at Julian to Randolph Co. line and from U. S. Rt. 421 at Friendship to U. S. 29-A and 70-A, at High Point, N. C. Rts. 62 and 68, Betterment Sect. 5-6-46-155, Guilford Co., $25,000-$50,000; 30.1 mi. road from N. C. Rt. 27 to west city limits of Mooresville on N. C. Rt. 150, from east city limits of Mooresville to Rowan Co. line on N. C. Rt. 159 and from N. C. Rt. 150 to Rowan Co. line on N. C. Rt. 152, Betterment Sects. 9-6-83-125, 9-6-79-116, 9-6-82-115, Lincoln Catawba, and Iredell Counties, $50,000-$75,000; 2.8 mi. road between N. R. Rt. 18 and city limits of Newton on N. C. 10, Betterment Sects. 9-6-83-126 and 9-6-79-117, Lincoln and Catawba Counties, $25,000-$50,000; 26.36 mi. road from Iredell Co. line toward Barber on N. C. Route 801 and from Iredell Co. line to China Grove on N. C. 152, from N. C. 152 to Landis on N. C. 153 and on County Road in China Grove and in Landis, Betterment Sects. 7-6-64-123 and 7-7-64-36 and Code 5900-721-3 and Code 5900-707-3, Rowan Co., $25,000-$50,000. W. V. Baise, Raleigh, engr.

West Virginia—State Rd. Comn., Charleston, bituminous concrete paving 5.6 mi. U.S. 119 toward Harrison Co. line, (State Route 57), S.P. 3475, 3453 and 3453-B, Barbour Co.; surface treatment 2.05 mi. Wilsonburg toward State Route 20 Rd. (Secondary Rd. 9), State Secondary Proj. 6407; 0.9 mi. Junction Sect. 9 toward Dola Rd. (Secondary Route 16), State Secondary Proj. 5513; 2.5 mi. Clarksburg to Chiefton Rd. (Secondary Route 11), State Secondary Proj. 6409; 2.4 mi. Lumberport to Junction Secondary 3/4 Rd. (Secondary Route 6/6), State Secondary Proj. 5509, surface treatment and penetration macadam paving 4.35 mi. Lumberport toward Wallace Rd. (State Route 20), S.P. 2270 and 3522, 0.15 mi. Lost Creek toward West Milford Rd. (Secondary Route 27), State Secondary Proj. 6052; 4.9 mi. Mt. Clare-Lost Creek Rd. (Secondary Route 25 and 44), State Secondary Proj. 6055; penetration macadam paving 2.15 mi. Wyatt-Peoria-Pine Bluff Rd. (Secondary Routes 3 and 8), State Secondary Proj. 6278; 1.3 mi. Junction Secondary Route 3 at Peoria up Cunningham Run Rd. (Secondary Route 8), State Secondary Proj. 5725; 1.65 mi. State Route 73 up Horner Run Road (Secondary Route 12/2), State Secondary Proj. 5204; 1.4 mi. Bridgeport toward U.S. 19 at Meadowbrook Rd. (Secondary Route 24), State Secondary Proj. 5516, all foregoing Harrison Co.

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The Pioneer Self Caulking Material for C. I. Pipe

TABLE OF COMPARATIVE QUANTITIES

Nominal Inside dia. of pipe, in.	Depth of joint Inches of Leadite	Approx. lbs. of Leadite per joint	Depth of joint, Inches of lead	Approx. lbs. of lead per joint
4	2.5	2.00	2.25	8.56
6	2.5	3.00	2.25	11.71
8	2.5	4.00	2.25	14.63
10	2.5	5.00	2.25	17.70
12	2.5	6.00	2.25	20.86
14	2.5	7.00	2.25	24.02
16	2.5	8.25	2.25	33.07
18	2.5	9.25	2.25	36.88
20	2.5	10.50	2.25	40.71
24	2.5	13.00	2.50	53.02
30	2.75	16.00	2.50	65.36
36	2.75	19.00	2.50	77.96
48	3.50	30.00	3.00	121.15
54	4.0	38.00	3.00	135.60
60	4.0	42.00	3.00	150.70

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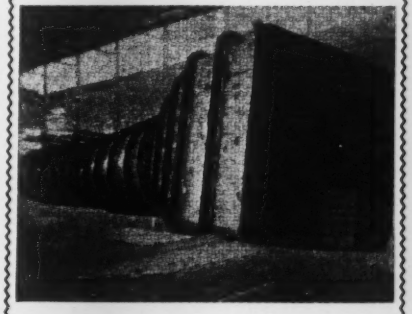

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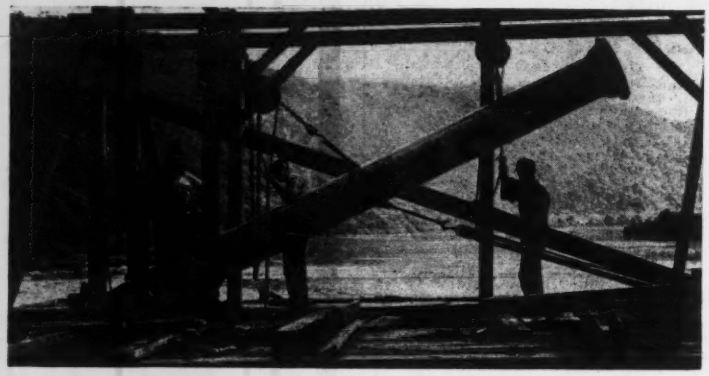

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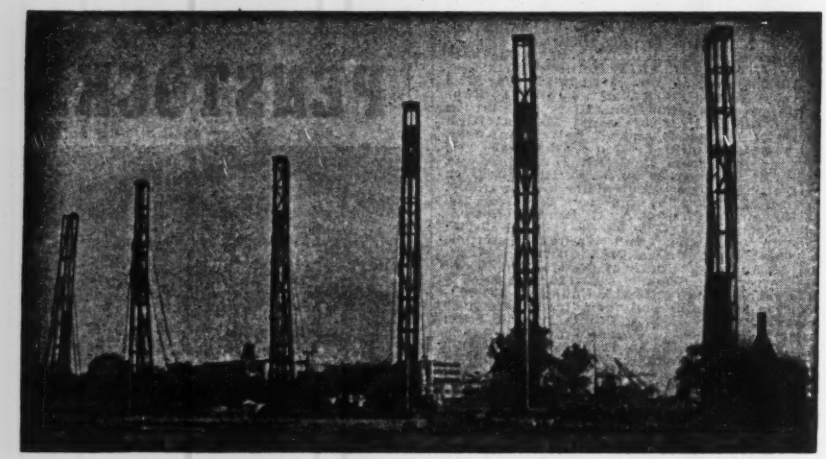

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STREETS and ROADS (Bids Asked) (Cont.)

Wisconsin—State Hy. Comn., at Inv. Co., Wisconsin Theatre Bldg., Wisconsin Rapids, gravel or crushed stone surfacing 3,900 cu. yd., Neillsville-Klondike Rd., U. S. Hy. 10, A.F.E. No. 71-15 and Klondike-Auburndale Rd., U. S. Hy. 10, A.F.E. 71-13, Wood Co., disintegrated granite surfacing 21,500 cu. yd. Stratford-Moisnee Rd., State Trunk Hy. 153 and A.F.E. 37-24 and Junction State Trunk Hy. 153, Marathon Rd.; 9 mi. State Trunk Hy. 107 A.F.E. 37-25; hauling, placing 6,250 cu. yd. gravel surfacing Abbotsford-Wausau Rd., State Trunk Hy. 29, A.F.E. 37-19, and Abbotsford-Marshfield Rd., State Trunk Hy. 13, A.F.E. 37-20, all in Oregon-Marathon Co.

Bids Asked June 21

California—State Div. Hys., Sacramento, replacing plant mix surfacing over existing surface and reshaping shoulders 7.25 mi. road between Daggett and Hector, San Bernardino Co. Extended date. G. T. McCoy, state hy. engr. CD 5/23—ENR 5/24.

Bids Asked June 21

★ **Texas**—D. C. Greer, engr., State Hy. Comn., Austin, strengthening flexible base course, placing single asphalt surface treatment 8.892 mi. Hy. 78, Control 281-1-7 & 9, Collin Co., $80,000; widening, patching concrete pavement, 26.119 mi. U. S. Hy. 59, Control 89, 3,4,5,6,7-12,10,7 and 8, Jackson and Wharton Counties, $250,000; flexible base, mixed in place bituminous paving, double asphalt surface treatment 4.796 mi. Hys. 96 and 87, Control 65-5-7, etc., Jefferson Co., $40,000; soil asphalt base, single asphalt surface treating 5.669 mi. U. S. Hy. 287 and St. 34 and 114, Control 122-2-7, 173-1-15-353-4-12, Navarro, Ellis and Dallas Counties, $80,000; flexible base, shoulders, double asphalt surface treating 7.173 mi. Hy. 44, Control 373-2 & 4-11 and 10, Nueces and Jim Wells Counties, $40,000; mixed in place bituminous concrete pavement 6.552 mi. U. S. Hy. 81, Control 13-10-14, Tarrant Co., $20,000; levelling up course and seal coat surfacing 17.996 mi. U. S. Hy. 77 and St. 85, Control 100-4-5 & 301-3-4, Wilson and Frio Counties, $20,000; seal coat surfacing 21.721 mi. Hys. 62 and 82, Control 131-2 & 3, 9 and 8, Lubbock and Crosby Counties, $20,000; widening concrete pavement 33.89 mi. U. S. Hy. 75, Control 166-4, 6 and 7-12, 7 and 10, Leon and Madison Counties, $250,000; asphalt surface treating 15.245 mi. Hy. 111, Control 346-6 & 7 7 & 4, Lavaca and Jackson Counties, $40,000; 6.368 mi. U. S. Hy. 77 and St. 34 & U. S. Hy. 67, Control 84-3-16, etc., Ellis and Kaufman Counties, $40,000; 4.635 mi. U. S. 90, Control 227-1-8, Harris Co., $80,000.

Bids Asked June 22

Pennsylvania—Dpt. Hys., Harrisburg, bituminous surfacing, etc. 9,334 ft. St. Lawrence Boro, Exeter Twp., Berks Co.; 2,857 ft. Cambria and Gallitzin Twps., Ebensburg Boro, Cambria Co.; 6,321 ft., Honeybrook, West Brandywine and East Brandywine Twps., Chester Co.; 20,697 ft. city of New Castle, Neshannock Twp., Lawrence Co.; 17,901 ft. Loyalsock and Old Lycoming Twps., city of Williamsport, Lycoming Co.; 508,954 sq. yd. city of Phila., Springfield Twp., Philadelphia and Montgomery Counties; 22,726 ft. Frailey, Tremont and Reilly Twps., Tremont Boro, Schuylkill Co.

Bids Asked June 23

✦**Maryland**—At Office H. J. Snelman, dist. engr. Pub. Roads Admin. 1440 Columbia Pike, Arlington, Va., constructing Proj. IH-1 Washington-Baltimore Parkway, between Laurel-Fort Meade Rd. and Annapolis Junction Rd., Anne Arundel Co. Plans deposit $10; adv. ENR 6/14.

Bids Asked June 26

✦**Maryland**—At Office H. J. Snelman, dist. engr. Public Roads Admin., 1440 Columbia Pike, Arlington, Va., constructing Proj. 1-2 Washington-Baltimore Parkway, between Jessup Rd. and Annapolis Junction Rd., Anne Arundel Co. Plans deposit $10; adv. ENR 6/14.

Bids Asked June 26

Washington—State Hy. Dpt., Olympia, selected roadway borrow and crushed stone surfacing, stockpiling crushed cover stone and mineral aggregates and construction light bituminous surface treatment 8.41 mi. Primary State Hy. 6, Wolfred north, Pend Oreille Co.; regrading 0.6 mi. ballasting, crushed stone surfacing, replacing small timber bridge with pipe culvert and base producing and stockpiling crushed stone surfacing and mineral aggregate, construction surface treatment and non-skid single seal treatment on 26.5 mi. Secondary State Hys. 5-H, 5-I and 5-J, Yelm to Nisqually River, Pierce and Thurston Counties. Plans deposit $2.

Bids Asked June 27

California—State Div. Hys., Sacramento, plant mix surfacing 11 mi. between Alameda Co. line and Milpitas between Los Gatos and San Jose and between Saratoga and Los Gatos and between Sunnyvale and Saratoga, Santa Clara Co.; 12.8 mi. between Hanford and State Hy. Route 4, Kings and Tulare Counties; placing road mix surfacing over existing surfacing and reshaping shoulders 6.2 mi. between Alabama Gates and Whiskey Canyon, Inyo and Mono Counties, G. T. McCoy, state hy. engr.

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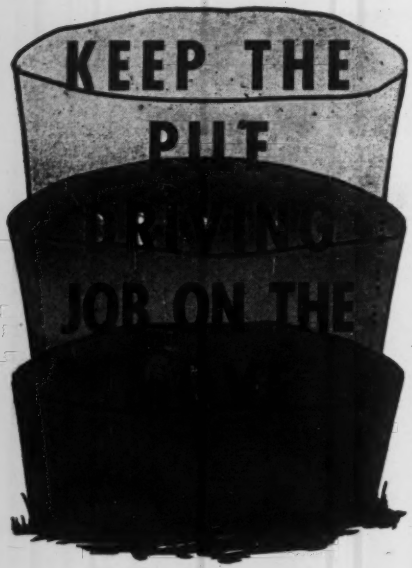

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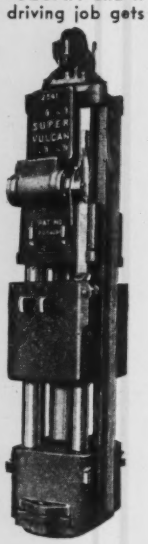

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STREETS and ROADS (Bids Asked, Cont'd.)

Bids Asked June 29

Kentucky—State Dpt. Hys., Frankfort, surface mix treatment 2.2 mi. RH 1008, Union-Big Bone Rd. from junction with US 42 at Union to Hueys Corner; 2 mi. RH 1011, Idlewild-Burlington Rd. from north corporate limit of Burlington and extend. north west; 3,391 mi. MP 8-150-A, Limaburg-Hebron Rd. from Ky. 18 at Limaburg to Ky. 20 at Hebron; 3 mi. MP 8-170-D, Constance-Petersburg Rd. from Hebron to Junction with Youell Rd.; seal coat treatment 2.1 mi. RH 1007, Price Pike Rd. from Junction with Ky. 18 to end of RH 1022; 5.1 mi. RH 1008, Union-Big Bone Rd. from Hueys Corner to junction with Ky. 383, at Big Bone; 5 mi. RH 1009, North Bend Rd. from Junction with Ky. 20 to Junction with Ky. 298; 4.2 mi. RH 1013, Verona-Mud Lick Rd. from junction with US 42 to junction with Ky. 16; 5 mi. RH 1014, Walton-Beaver Lick Rd. from west corporate limit of Walton to Junction with US 42; 2.8 mi. RH 1020 Hathaway Rd. from Hueys Corner to Hathaway School, all foregoing Group RH 2 (1945), Boone Co.; bituminous seal coat 2.358 mi. MP 222 GF, Fredonia-Eddyville Rd. from I. C. Railroad crossing in Fredonia to Lyon Co. Line, Caldwell Co., 11.273 mi. MP 62 ABE, Princeton-Hopkinsville Rd. from east corporate limit of Princeton to Christian Co. line, 9.594 mi. MP 11 AF, Kuttawa-Fredonia Rd. from junction with US 62 in Kuttawa to Caldwell Co. line, Lyon Co., 9,246 mi. MP 49 DEH, Poole-Sebree-Beech Grove Rd. from junction with US 41 at Poole to Green River at Eastwood Ferry, Webster Co., all foregoing Group MP 1 (1945); bituminous resurfacing 8.803 mi. Warsaw-Owenton Rd. from US 42 in Warsaw to bridge over Eagle Creek, MP 39-1073-A, 39-73-B, Gallatin Co., 5.984 mi. Owenton-Warsaw Rd. from US 227 at Sanford's Pond to bridge over Eagle Creek at Sparta, MP 94-13-D, Owen Co., both Group MP 1 (1945); bituminous surfacing 8.192 mi. Pineville-Manchester Rd. (Ky. 21), from bridge at Pine St. in Pineville and extend. toward Manchester via Carey, SP 7-24, Bell Co., 2.2 mi. Pineville-Jensen Rd. (Ky. 221), from junction with Ky. 21, near Straight Creek to Jensen, SP 7-44, 6.129 mi. Williamsburg-Pineville Rd. (Ky. 92), from junction with US 25 at Williamsburg to junction with Catliff Rd., SP 118-40, 118-60, Whitley Co., all foregoing Group 29 (1945); traffic bound surfacing 4.034 mi. Kettle-Bow School Rd., beginning at junction with Ky. 61 near Kettle and extend. to Bow School, SP 29-167, Cumberland Co.; high type surfacing 10.98 mi. Louisa Paintsville Rd. beginning at end improved section, approx. 8 mi. south of Louisia and extend. to Johnson Co. line, FA 78-(6), SP 64-53, Lawrence Co.; widening concrete culvert 1½ mi. east of Morganfield, SP 113-127, Morganfield-Boxville Rd., Union Co.; bituminous surfacing driveways Proj. 1, at Feeble Minded Institute, at Frankfurt, Proj. 5, Children's Home at Lyndon, Proj. 6, Central State Hospital at Lakeland. Bids 5/29 rejected. CD 5/14—ENR 5/17; Proj. 7, State Reformatory at LaGrange; Proj. 8, Women's Div., State Reformatory at Pewee Valley; Proj. 9, State Penitentiary at Eddyville; 11.3 mi. Portwood-Kingston Rd. beginning at junction with Ky. 52 at Portwood and extend. to junction with US 25 at Kingston, DA-WI 24, SP 76-191, 76-291, Madison Co.

Bids Asked June 29

Tennessee—State Hy. Dpt., Nashville, grading, draining, surfacing 1.361 mi. section State Hy. 61, beginning at point on Hy. 61 approx. 1.1 mi. southwest of Clinton exten. to junction with State Hy. 9, in Clinton, Proj. No. DA-WI 31-A(1); grading, drainage, paving 3.051 mi. addnl. traffic lanes on State Hy. 9, beginning at Knox Co. line to point north of Edgemoor Rd., SN-F.A.P. 82-A(3), both Anderson Co.; bituminous resurfacing 7.407 mi. State Hy. 9, between city limits of Knoxville and Anderson Co. line, SN-F.A.P. 222-A(3), Knox Co.

Bids Asked

Pennsylvania—State Dpt. Hys., Harrisburg, cancelled bids to have been opened June 5, imprv. 20.05 mi. 7 highway projects. Will readvertise. CD 5/28—ENR 5/31.

LOW BIDDERS

California—State Div. Hys., Sacramento, June 6 imprv. 1.2 mi. Alameda Co., from Frederickson & Watson Constr. Co., 873 81 Ave., Oakland, **$147,180**; 2.2 mi. Kern Co., from Griffith Co., 1060 S. Bway., Los Angeles, **$30,482**. Received no bids June 6, imprv. 5.3 mi. Shasta Co., CD 4/23—ENR 4/24.

†California—Pub. Roads Admin., 720 Phelan Bldg., San Francisco, June 7, constructing 9 mi. access road to Cat Creek Basin Timber areas, El Dorado Co., from KRC Constr. Co., 2068 Allston Way, Berkeley, **$31,350**. CD 5/29.

D. C., Wash.—District Comrs., District Bldg., June 1, covering various concrete roadways, from McGuire & Rolfe, Inc., I and O Sts. S.E., **$44,996**.

★**Illinois**—State Hy. Dpt., Springfield, June 1, concrete pavement patching, U. S. Routes, 45, 150 and 54 and State Bond Issue Route 48, Champaign, DeWitt, Douglas, Ford and McLean Counties, from Central Paving Co., Champaign, **$51,972*****. Marked Route 34, State Aid Routes 1, 1a, 6 and 6a, State Bond Issue Routes 14, [illegible] and 148, Franklin, Perry and Hamilton Counties, from The Chas. B. Cochran Corp., Marion, **$96,553*****Marked Route 140, Madison Co., from Edwardsville Constr. Co., Edwardsville, **$26,000*****State Bond Issue Routes 3 and 156 and concrete repairing 9.2 mi. State Bond Issue Route 156, Monroe Co., from Parham Constr. Co., East St. Louis, **$39,872*****concrete pavement patching State Aid Route 9, State Bond Issue Routes 12, 158 and 159, St. Clair Co., from Maurice Hoeffken Co., Belleville, **$55,027*****U. S. Route 50 and State Bond Issue Route 127, St. Clair and Clinton Counties, from Keeley Bros. Constr. Co., 4211 State St., East St. Louis, **$58,809*****U. S. Route 24, Tazewell Co., from R. A. Cullinan & Son, Tremont, **$54,114*****concrete pavement patching and concrete resurfacing 6.2 mi. Marked Route 91, Peoria and Stark Counties, from Graham Paving & Constr. Co., 30 N. LaSalle St., Chicago, **$329,858*****bituminous resurfacing 4.8 mi. State Bond Issue Route 5, Winnebago Co., from Rockford Black Top Construction Co., 1615 Westchester Dr., Rockford, **$135,583.**

Ill., Chicago—City, Dpt., P. Wks., City Hall, June 5, imprv. S. Pulaski Rd., W. 41 to W. 31 Sts., from Leininger Constr. Co., 30 N. LaSalle St., **$30,409.** CD 5/28—ENR 5/31.

★**Indiana**—State Hy. Comn., Indianapolis, June 5, imprv. 60.79 mi. Montgomery, Tippecanoe and Fountain Counties, from Grady Bros. Constr. Co., 2702 Barnes St., Indianapolis, **$116,430,** est. $126,817***53.21 mi. Grant, Huntington, Wells and Wabash Counties, and 52.22 mi. Randolph, Wayne, Henry, Hamilton and Madison Counties, from Meshberger Bros., Linn Grove, **$76,795** and **$98,415** respectively, est. $92,405 and $107,082 respectively***56.5 mi. Johnson, Shelby, Clark, Harrison, Floyd, Scott, Washington and Jefferson Counties, and 60.14 mi. Pike, Spencer, Dubois, and Crawford Counties, from L. P. Cavett Co., 511 Shepherd St., Cincinnati, O., **$94,382** and **$119,202** respectively, est. **$104,371** and **$120,820** respectively***49.86 mi. LaPorte, St. Joseph, Newton, Jasper and Porter Counties, from Barber Paving & Engr. Co., 7 S. Dearborn St., Chicago, Ill., **$101,636,** est. $106,247*** 50.08 mi. White, Carroll, Cass, Miami, Jasper and Pulaski Counties, from John Dehner, Inc., 1206 Clark St., Fort Wayne, **$100,177,** est. $168,260***50.5 mi. Ripley, Dearborn, Jefferson and Switzerland Counties, from P. H. Rohe, Aurora, **$90,346,** est. $94,493***56.51 mi. Sullivan, Knox, Greene, Clay, and Washington Counties, from Bituminous Materials Co., 34 St. and Ft. Harrison Rd., Terre Haute, **$110,900.** CD 5/26—ENR 5/31.

Kentucky—State Hy. Dpt., Frankfort, June 8, imprv. 5.012 mi. Harlan Co., from J. C. Codell & Co., Winchester, **$238,878***** 3.181 mi. Jefferson Co., from Henry Bickel Co., 1020 E. Chestnut St., Louisville, **$30,767*****12.64 mi. Boone, Kenton and Grant Counties, from H. K. Williams, 1326 S. 7 St., Louisville, **$85,006.** CD 5/22, 5/24—ENR 5/24, 5/30.

Louisiana—State Hy. Dpt., Baton Rouge, June 1, imprv. 14.74 mi. Evangeline Parish and 141 mi. Beauregard Parish, from W. B. Aldrich & Co., Kalwrah University Gardens, Baton Rouge, **$56,895** and **$45,887** respectively***99.4 mi. Allen Parish, from Core Bros., Covington, **$34,258*****103.7 mi. Vernon Parish, from E. A. Caldwell, Reymond Bldg., Baton Rouge, **$49,877.** CD 5/9—ENR 5/17.

Md., Baltimore—City, c/o Bd. Awards, City Hall, June 7, sheet asphalt paving various streets, Contr. S.A. 795, from P. Flanigan & Son, 2405 Loch Raven Rd., **$43,734.** CD 6/1.

N. Y., Rockaway—President Queens Boro, 120-55 Kew Gardens, Zone 15, June 6, repairing Beach Channel Dr. from Jacob Riis Park to Cross Bay Blvd., from Milljoy Constr. Co., 515 Ave. I, Brooklyn, Zone 30, **$39,373.**

†Washington—Pub. Roads Admin., New P. O. Bldg., Portland, Ore., June 1, imprv. 5.53 mi. Stevens Pass Hy., in Snoqualmie National Forest, from Rush & Baird, 1411 4 Ave., Seattle, Zone 1, **$187,695.** Est $196,417. CD 5/25.

CONTRACTS AWARDED

†Calif., Alameda—U. S. Eng., 74 New Montgomery St., San Francisco, Zone 13, addnl. surfacing, Alameda intransit Depot, Contr. 04-203-eng-2080, to L. J. Immel, Berkeley, **$135,780.**

Ia., Iowa City—Bd. Supervs. Johnson Co., Iowa City, imprv. 39.74 mi. various secondary roads, to C. Chadek, Iowa City, **$36,464.** Bids 5/28. CD 5/23.

Ia., Mason City—Bd. Supervs., Cerro Gordo Co., Mason City, imprv. secondary roads, to Maudlin Constr. Co., Webster City, **$46,870.** Bids 5/28. CD 5/23.

Kansas—State Hy. Dpt., Oberlin, imprv. 12.717 mi. Decatur Co., City to Broce Constr. Co. 214 S. 2 St., Dodge City, **$53,736.** Bids 5/9, awarded 6/5. CD 4/25—ENR 5/3.

Kansas—State Hy. Dpt., Oskaloosa, imprv. 10.794 mi. Doniphan Co., to Geo. Bennett Constr. Co., 901 N. 3 St., Kansas City, Kan., **$46,473.** Bids 5/18, awarded 5/24. CD 5/9.

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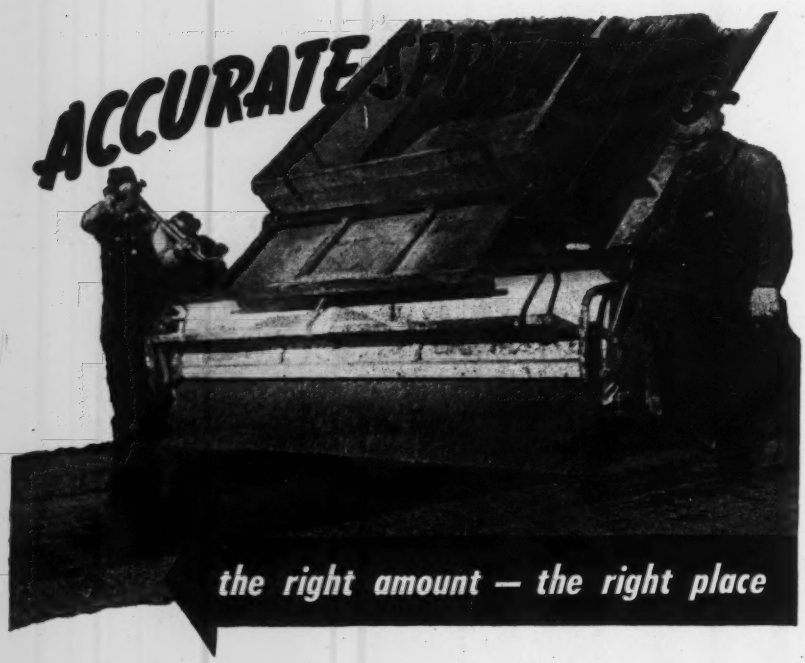

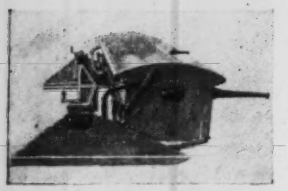

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STREETS and ROADS (Contracts Awarded, Cont'd.)

Minnesota—State Hy. Dpt., District Office, Rochester, crush, screen, load and haul about 32,964 cu. yd. crushed rock, etc. to Rochester, to Roverud Bros., Spring Grove, **$46,427**, and Quarve & Anderson, Rochester, **$36,003**. CD 5/2—ENR 5/10.

Minn., Crookston—H. J. Welte, agrl. Pol. Co., scattered road maintenance work throughout county, crush, screen, haul and houling about 73,500 cu. yd. gravel, 9,500 cu. yd. stripping, 1,102,500 cu. yd. mi. haul to C. P. Roth, Brainerd, **$103,970**. Bids 5/24. CD 5/16.

†**N. J., Bayonne**—Yards & Docks, Navy Dpt., 18 St. and Constitution Ave., N.W., Wash. 25, D. C., miscellaneous paving, Navy Yard, Bayonne Annex, NOY 12159, to Nassau Constr. Co., Inc., 103 Park Ave., New York 17, N. Y., **$25,400**.

Ore., McMinnville—City, City Hall, grading, paving, concrete curbs and gutters on 28 block streets in paving Dist. 1, to J. C. Compton Co., McMinnville, **$44,902**. Est. $44,000. Bids 5/29. O. C. Yokum, City Hall, city engr.

Tex., Dallas—City, City Hall, concrete curbs, gutters, drives and walks, to Texas Bitulithic Co., 111 Commerce St., approx. **$25,000**.

Tex., Houston—Rheem Mfg. Co., M & M Bldg., roads, parking areas, to Tellepsen Constr. Co., 3900 Clay St., approx. **$37,000**.

Washington—State Hy. Dpt., Olympia, to Peter Kiewit & Sons, 1403 W. 45 St., Seattle, Zone 7, imprv. 3.2 mi. Clallam Co., $34,139; 3.5 mi. Clallam Co., **$34,517**; 10.9 mi. Pierce Co., **$64,104*****to S. Birchard Sons Constr. Co., Ford Bldg., Great Falls, Mont., impry. Primary State Hy. 5 and Secondary State Hys. 1-X, 5-D and 5-E, Pierce Co., **$78,264***** to McAtee & Heathe, E. 3527 Trent St., Spokane, imprv. Primary State Hys. 3 and 18 and Secondary Hys. 4-B and 11-C, Whitman and Lincoln Counties, **$61,217**. Grand total $272,241. CD 5/22—ENR 5/24.

Ont., Ingersoll—Council, concrete paving King and Bell Sts., to Towland Constr. Co., 294 Dundas St., London, **$29,000**. Awarded 5/24.

Ont., Casselman — Cambridge Twp., A. Lafleche, clk., Casselman, reconstructing roads, day labor. **$27,000**.

EARTHWORK, WATERWAYS

BIDS ASKED

Bids Asked June 20

†**Conn., Stamford**—U. S. Eng., 819 Industrial Trust Bldg., Providence 2, R. I., dredging, maintenance work, Stamford Harbor.

Bids Asked June 23

O., Findlay—At Office J. M. Stough, engr. Hancock Co., Findlay, imprv. McComb Joint Co., Wm. Hutson & H. B. Thomas Ditch. $45,209. Plans deposit $10.

Bids Asked June 28

La., Erath — Bd. Comrs. Prairie Gregg Drainage Dist., Bank of Erath, R. E. Golden, secy., dredging approx. 247,000 cu. yd. earth excav. on 19 mi. drainage canals, Vermillion Parish. Plans deposit $10. R. I. Tanner, Abbeville, engr.

Bids Asked July 2

Mont., Libby—Mountain States Power Co., Albany, Ore., concrete arch dam 55 ft. above bed rock and 125 ft. long at crest, and clearing reservoir covering 22 acres. Over $15,000. G. McClellan, c/o owner, ch. engr.

Bids Asked July 3

†**Mississippi and Louisiana**—U. S. Eng., P. O. Box 60, Vicksburg, Miss., assemblying, placing approx. 70,000 squares articulated concrete mattress and grading approx. 1,400,000 cu. yd. river bank on Mississippi River between Greenville, Miss., and New Orleans, La.

Bids Asked July 5

†**Montana** — Bureau Reclamation, Court House, Denver, Colo., furnishing, del. f.o.b. cars shipping point or f.o.b. cars Dodson, 1 motor-driven, vertical-shaft, single-stage, propeller-type pump, unit, complete with motor, control equip., accessories required for complete operating unit, for Dodson Pump. Plant, Milk River Project, Spec. 1807-D.

CONTRACTS AWARDED

†**Louisiana**—U. S. Eng., foot of Prytania St., New Orleans, Zone 9, 542,000 cu. yd. uncompacted earthwork and 132,000 cu. yd. compacted earthwork, Angelina Levee of the Ponchartrain Levee Dist., St. John The Bantist Parish, Inv. 16-047-45-84, to W. P. Villere Co., 1100 S. Claiborne St., New Orleans, **$139,049**. Bids 6/4, awarded 6/6. CD 5/9—ENR 5/17.

†**Ore., Boonеville**—U. S. Eng., 628 Pittock Block, 10 Ave. and Washington St., Portland, Zone 5, cleaning, painting spillway dam gates and powerhouse intake gates at Bonneville Dam, to Wailes-Dove Hermiston Corp., 659 E. Gage Ave., Los Angeles, Calif., **$82,936**. CD 5/7—ENR 5/10, under I.B.

N. S., Parrsboro Beach—Dpt. P. Wks., Ottawa, Ont., breakwater repairs, to J. Urquhart, Ltd., Parrsboro Beach, $51,000. Bids 4/24. CD 4/16—ENR 4/19.

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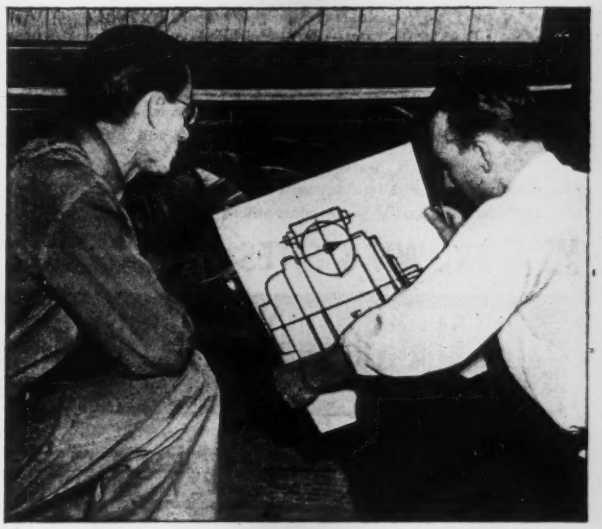

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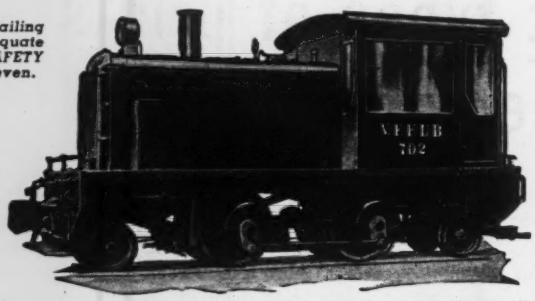

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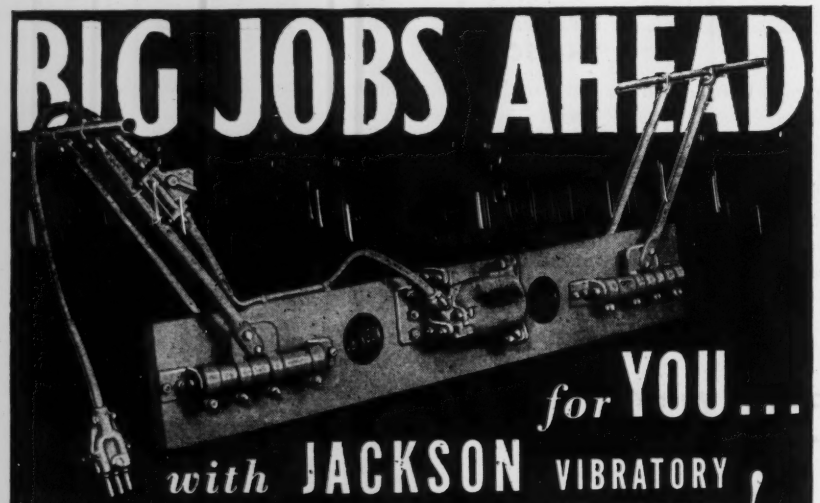

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LATIN AMERICA

Brazil, Vitoria—Republic of Brazil, Rio de Janeiro plans lengthening iron ore dock from 80 meters to 110 meters, alongside dock. $200,000.

Colombia, Armenia—Republic of Colombia, Bogota, plans reconstructing track, Armenia-Ibaque Railroad. 500,000 Pesos.

Colombia, Narino—Republic of Colombia, Bogota, plans constructing Puerres-Guamuez Rd., near border of Ecuador. 1,000,000 Pesos. Dpt. P. Wks., Bogota, engr.

Colombia, Tumaco—Republic of Colombia, Bogota, plans port construction, incl. concrete dykes, wharves, loading and unloading facilities. 1,000,000 pesos voted.

Guatemala, Guatemala City—Republic of Guatemala, Guatemala City, plans national stadium. $200,000. Secretariat of Communications & Public Works, Guatemala City, engr.

Mexico—State of Coahuila, Gov. Benecio Lopez Padilla, Capital City, Torreon, will construct road between Piedras Negras and Villa Acuna, by own forces. $125,000.

Mexico—State of Chihuahua, Capital City, Chihuahua City, Gov. Foglio Miramontes, will construct state-wide road building and repairs by own forces. $2,800,000.

Mexico—State of Oaxaca, Gov. Vicente Gonzales Fernandez, Capital City, Oaxaca, will construct, repair state highways incl. road from Oaxaca to Sola de Vega, by own forces. $200,000.

Mexico—State of Vera Cruz, Capital City, Jalapa, bids within 90 days schools throughout state, incl. cities of Piedras Negras, Alvarado, Tlacotalpan, Cosoleacaque, Acayucan, Jesus Carranza, Playa Vince te, Zoteapan, San Andres Tuxtla, Santiago Tuxtla, Catemaco, $750,000. L. G. Rivadeneyra, Jalapa, archt.

Mexico—Shoemaker & Evans, c/o Chamber of Commerce, Mexico City, plans cement plant in State of Puebla, $4,000,000.

Mexico, Acapulco—Federal Health & Assistance, Dr. Gustavo Baz, secy., Reforma y Lieja, Mexico City, takes bids within 90 days hospital. $650,000.

Mexico, Calimaya—City, takes bids in July, school, community hall, etc. $150,000.

Mexico, Chiapa de Corzo—State of Chiapas, Gov. Juan N. Esponda, Capital City, Tuxtla Gutierrez, bids latter part June, 2 schools, playgrounds $300,000.

Mexico, Culiacan—State of Sinaloa, Juan Guerrero Alcocer, dir. State Public Works, Capital City, Culiacan, will construct Sanalona Dam on waters of Tamaxula River, near here, by own forces. $3,000,000.

Mexico, Durango—City, Municipal Hall, will construct modern stadium for bullfights, racing, etc., consisting of stands, dressing rooms, etc., by own forces. $200,000.

Mexico, Guadalajara—City of Guadalajara, Municipal Hall, will construct, repair city roads, principal work on Liberated Ave., and Calzada Independence Ave., by own forces. $125,000.

Mexico, Guymas—City, J. M. Parada, in charge, Guymas, will construct roads, repairs, etc., by own forces. $110,000.

Mexico, Manzanillo—Mexican Government, Scrita. de la Marina, Mexico, D. F., plans port imprvs., featuring under and above sea rock excavations, building wharf, railroad yards, warehouses. $3,750,000.

Mexico, Mexico City—Cia. Fundidora Nacional, S.A., Apartado Postal 220, Mexico, D.F., plans cable clamps, iron water pipe connections, etc. plant. $415,000.

Mexico, Mexico City—Fabricar Articulos Metalicos, S.A., (Isidora Diaz Lombardo, Roberto Serralde, Ricardo Arenas, owners) Mexico City, plans factory mfg. metal products, $50,000.

Mexico, Mexico City—Republic of Mexico, Mexico City, plans factory (Cooperative de Obreros de Vestuario y' Equipo). 3,000,000 Pesos.

Mexico, Mexico City — Secretary Communications & Public Works, Pedro Martinez Tornell, dir., Tacuba St., will improve Mexico City airport, incl. new runways, conditioning of drainage, enlarged waiting rooms, etc., by own forces. $500,000. CD 1/17—ENR 1/25.

Mexico, Monterrey—La Cia. Cigarrera La Moderne, S.A., Monterrey, bids within 90 days Raleigh cigarette mfg. factory addn. $50,000.

Mexico, Nuevo Laredo—City, V. Villarreal, dir., Municipal Hall, N. L., Tamps, will construct roads to main thoroughfares, by own forces. $100,000.

Mexico, Perote—Federal Health & Assistance, Reforma y Liega, Mexico City. G. Baz, dir., bids within 100 days, hospital. $550,000.

Mexico, Ramos Arizpe—City, Municipal Hall, takes bids in August, construct drainage sys. $100,000.

Mexico, San Luis Potosi—City will construct, repair water sys., sewers by own forces. $175,000. CD 3/30—ENR 4/5.

Mexico, Tacotan—State of Jalisco, Gov. Marcelino Garcia Barragan, Capital City, Guadalajara, plans addnl. work on dam in Tacotan district for irrigation purposes, nearby cities, $1,200,000.

Mexico, Torreon — Petroleos Mexicanos, Efrain Buenrostro, mgr., 92 Juarez, Mexico City, plans refinery supplying Chihuahua, Durango, Zacatecas, Aguascalientes, Saltillo, Monterrey, and Torreon sections, also necessitating oil line from Tampico oil fields to Torreon, $1,000,000.

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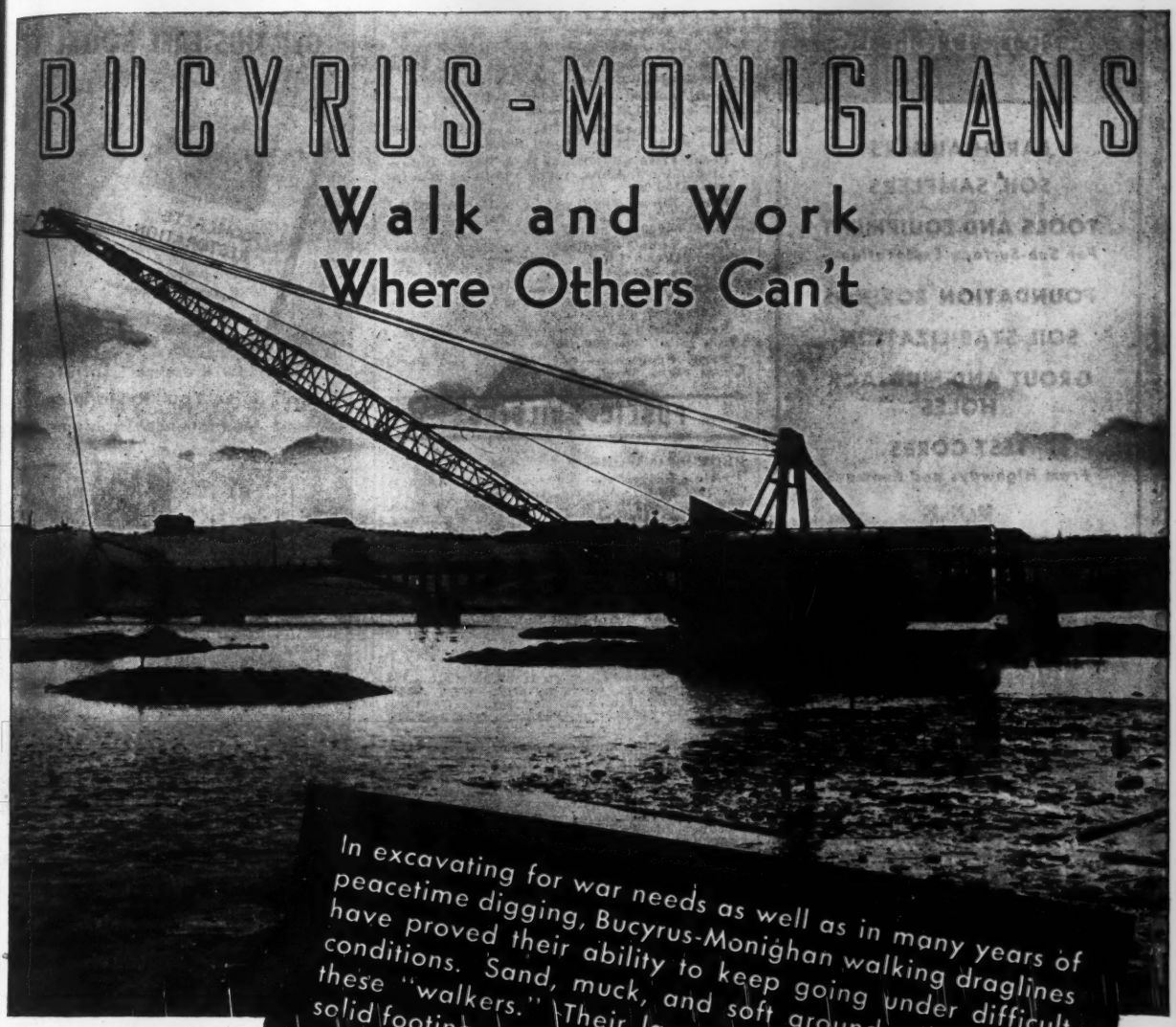

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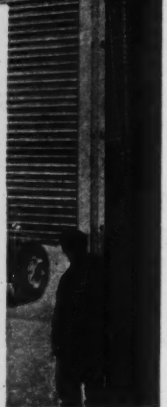

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LATIN AMERICA (Cont'd.)

Peru, Ayacucho—Cia Hotelera del Peru, Lima, plans hotel. 520,000 Soles.

Peru, Chimbote—Cia Hotelera del Peru, Lima, plans hotel. 250,000 Soles.

Peru, Iquitos—Cia Hotelera del Peru, Lima, plans hotel. 1,215,000 Soles.

Peru, Juliaca—Cia Hotelera del Peru, Lima, plans hotel. 250,000 Soles.

Peru, Lima—Syndicate, c/o Banco Industrial del Peru, Lima, plans rayon yarn mfg. plant. $150,000.

Peru, Lima—Syndicate, c/o Banco Industrial del Peru, Lima, plans rayon twisting mill. $100,000 or more.

Peru, Lima—Syndicate, c/o Banco Industrial del Peru, Lima, biscuit, etc. mfg. plant. $100,000.

Peru, Lima—Syndicate, c/o Banco Industrial del Peru, Lima, plans woolen mill. $100,000.

Peru, Nazca—Cia Hotelera del Peru, Lima, plans hotel. 250,000 Soles.

Peru, Urubamba—Cia Hotelera del Peru, Lima, plans hotel. 250,000 Soles.

PUBLIC BUILDINGS

PROPOSED WORK

†**Ala., Enterprise**—Federal Works Agency, Candler Bldg., Atlanta, Ga., plans by C. C. Pearson, First National Bank Bldg., & F. L. Tittle, 121 Audubon Rd., both Montgomery, and bids soon recreation bldg. for service men. $69,500. CD 5/23—ENR 5/31.

†**Calif., San Francisco**—Pub. Housing Auth., NHA, 760 Market St., plans by Ward & McCarthy, 504 Montgomery St., 110 temporary family dwelling units, Calif. 4980.

†**Calif., San Francisco**—Pub. Housing Auth., NHA, 760 Market St., plans by Bernardi & Hutchinson, 402 Jackson St., 117 family dwelling units, Calif. 4155.

†**Ill., Chicago**—Chicago Housing Auth., 343 S. Dearborn St., plans by Holabird & Root, 333 N. Michigan Ave., 500 family dwelling units, Ill. 11235, for NHA. CD 2/8—ENR 2/15.

†**Ind., Indianapolis**—McQuay Norris Co., 1737 Massachusetts Ave., R. F. Crum, mgr., plant addn. $350,000 or more with equip. Defense Plant Corp. will finance.

†**N. Y., Voorheesville**—U. S. Eng., 120 Wall St., New York, Zone 5, will not construct prisoner of war camp. $275,000. Project cancelled. CD 4/30—ENR 5/10.

★†**Tex., Bonham**—Veterans Admin., Vermont Ave. between H and I Sts. N.W., Wash. 25, D. C., 350-bed hospital. $2,450,000.

†**Tex., Fort Worth**—U. S. Eng., 231 W. Main St., Denison, guard, range and ammunition storage houses and target butt, at Aircraft Assembly Plant, Ser. 34-066-45-56. $150,000.

★†**Tex., Odessa**—United Carbon Co., Inc., United Carbon Bldg., Charleston, W. Va., carbon black plant, $3,577,000. Defense Plant Corp. will finance.

★†**Tex., Sweetwater** — Veterans Admin., Vermont Ave. between H and I Sts. N.W., Wash. 25, D. C., 500-bed veterans hospital. $3,500,000.

†**Tex., Texarkana**—Pub. Housing Auth., NHA, 1411 Electric Bldg., Seventh and Lamar Sts., Fort Worth, 100 stop-gap dwelling units, $150,000.

†**Wash., American Lake**—Veterans Admin., Vermont Ave. between H and I Sts. N.W., Wash. 25, D. C., 164-bed veterans hospital addn. Over $150,000.

★†**Wash., Bremerton**—School Bd., Bremerton, plans by Naramore, Bain, Brady & Johanson, Smith Tower, 2 Ave. and Yesler Way, Seattle, Zone 4, 2 schools at West Sheridan and View Ridge, and school addns. at E. Bremerton and Manette, $740,000. **FWA.**

†**Wash., Spokane**—Veterans Admin., Vermont Ave. between H and I Sts. N.W., Wash. 25, D. C., 300-bed veterans hospital. Over $150,000.

†**Wash., Tacoma**—Pub. Housing Auth., NHA, Skinner Bldg., 5 and Union Sts., Seattle, Zone 1, plans by Lea, Pearson & Richards, Tacoma Bldg., permanent child care center, at Salishan Housing, Wash. 5-1. $20,000.

†**Wis., Merrimac**—Pub. Housing Auth., 20 Wills St., Chicago 6, Ill., plans by L. Siberz, 103 W. Mifflin St., Madison, 125x145 ft., and 40x60 ft., school, Wis. 47-149-F. $91,000.

†**T. H., Oahu**—Pub. Housing Auth., NHA, 760 Market St., San Francisco, Calif., plans by Fish, Johnson, Ossipoff, Preis, Austin & Towell, Shuman Bldg., Honolulu, 750 temporary family dwelling units, TH 51032; plans by R. C. Kelley, 2270 Kuhio Ave., Honolulu, 250 temporary family dwelling units, TH 51033.

★**N. B., Moncton**—Moncton Hospital Bd., Moncton, 119 bed hospital addn. $419,475; maternity wing, $269,280; nurses home, $269,000. CD 3/8—ENR 3/15.

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PUBLIC BUILDINGS (Cont'd.)

BIDS ASKED

Bids Asked June 18

Ont., Hamilton—C. M. Nixon, dist. supt., c/o Dpt. Veterans Affairs, 21 Lombard St., Toronto, 100 houses in vicinity of Hamilton consisting 52 houses in Ancaster Twp., Westworth Co., and 48 houses located in Nelson Twp., Hatton Co. About $450,000.

Bids Asked June 19

†**N. Y., Castle Point**—Veterans Admin., Vermont Ave., between H and I Sts. N.W., Wash. 25, D. C., test borings for hospital, CD 2/23—ENR 3/1.

Bids Asked June 22

†**Md., Baltimore**—Federal Works Agency, 18 and F Sts. N.W., Wash. 25, D. C., 8 classroom school addn. at Soliers Point, MD-18157. Plans deposit $5. $78,000. CD 4/27—ENR 5/10.

†**Mich., Warren** — Warren Consolidated School Dist. 1, Fractional of Warren & Sterling Twps., at office of Supt. High School Bldg., Warren, 6-classroom school, west of Milton Rd., north of Eleven and a Half Mile Rd., Mich. 20-380-N. **FWA.** Plans deposit $15. F. D. Madison, Royal Oak, archt.

Bids Asked June 23

†**Ore., Eugene**—Pub. Housing Auth., NHA, Skinner Bldg., 5 and Union Sts., Seattle 1, Wash., 40 family dwelling units, Ore. 35316. $80,000. Extended date. G. B. Smith & M. Fritsch, Walling Bldg., archts. CD 6/1.

Bids Asked About June 25

†**Va., Norfolk**—Pub. Bldgs. Admin., 18 and F Sts. N.W., Wash. 25, D. C., 13 classroom school, at Alexander Park. J. B. Walford, 103 E. Cary St., Richmond, Zone 19, archt. CD 6/1—ENR 6/7.

Bids Asked June 26

†**Calif., Hunters Point**—Assistant Div. Engineer's Office, Federal Works Agency, Bureau of Community Facilities, 2223 Fulton St., Berkeley, 10 addnl. classroom bldgs., at Ridge Point Schools, Units 1, 2 and 3, Hunter Point, Calif., 4-548-F. Plans deposit $15. D. A. Riedy, City Hall, city archt. CD 6/4—ENR 6/7.

Bids Asked June 26

Mich., Midland—Homer Twp. School Dist. 6, Midland Co., 1 story school on present school site about 5 mi. west of here, on M-20. Plans deposit $10. J. C. Goddeyne, Bay City, archt.

Bids Asked June 26

†**Ore., Cottage Grove**—Pub. Housing Auth., NHA, Skinner Bldg., 5 Ave. and Union Sts., Seattle 1, Wash., 40 housing units, Ore. 35320. $80,000. R. L. Morin, Pub. Service Bldg., Portland, archt. CD 5/25—ENR 5/31.

Bids Asked June 27

†**Ore., Roseburg** — Pub. Housing Auth., NHA, Skinner Bldg., 5 Ave and Union Sts., Seattle 1, Wash., 60 family housing units, Ore. 35300. $120,000. Extended date. V. E. Bailey, 711 S.W. Columbia St., Portland, archt. CD 6/1—ENR 6/7.

Bids Asked June 29

†**Ind., Bloomington** — Bloomington Hospital, Mrs. C. J. Sembower, pres. Local Council of Women, Bloomington, 2 story, bsmnt., brick, stone, structural steel, rein.-con. hospital addn., Ind. 12-223-N. $185,000. **FWA.** Plans deposit $25. McGuire & Shook, 1400-1401 Fletcher Trust Bldg., Indianapolis, archts. CD 5/25—ENR 5/31.

Bids Asked June 30

★**Conn., Hartford**—Bd. Directors, Hartford Hospital, 20 S. Hudson St., hospital bldg. $5,000,000. Coolidge, Sheply, Bulfinch & Abbott, 1 Court St., Boston, Mass., archts.

Bids Asked July 17

★†**Mass., Rutland Heights** — Veterans Admin., Vermont Ave. between H and I Sts. N.W., Wash. 25, D. C., addnl. bldgs., utilities, incld Patients Bldg. 44, $668,500; Laundry Bldg. 45, $157,500; Animal House Bldg. 46, $10,000; connecting corridor Bldg. 44 to Bldgs. 12-20, etc., $12,000. CD 3/22—ENR 3/29.

Bids Asked About July 27

★†**N. Y., Peekskill**—Veterans Admin., Vermont Ave. between H and I Sts. N.W., Wash. 25, D. C., hospital facilities, 2 mi. south of here. $5,790,000. CD 4/25—ENR 5/3.

Bids Asked

Mass., Charlton—Town, H. S. Gale, chn., Town Hall, 2 story, bsmnt., 35 x 50 ft. fire engine house. To exceed $40,000. N. Leathers, c/o American Optical Co., Southbridge, archt.

†**Mass., Fort Devens**—U. S. Eng., 31 St. James Ave., Boston, Zone 16, (selected bidders), library addns., No. 19-023-45-Neg-145. $20,000.

†**Tex., Hardin**—Roxboro Steel Co., Hardin, carbon black mfg. unit. $400,000. Defense Plant Corp. will finance. J. L. Endicott, Box 223, Liberty, archts. CD 3/30—ENR 4/5.

LOW BIDDERS

†**Calif., Benicia**—Pub. Housing Auth., NHA, 760 Market St., San Francisco, June 1, 150 prefabricated family dwelling units and altering social hall, Calif. 4984, from Biltwell Constr. Co., 4745 Geary Blvd., San Francisco, **$324,377.** CD 4/16—ENR 4/19.

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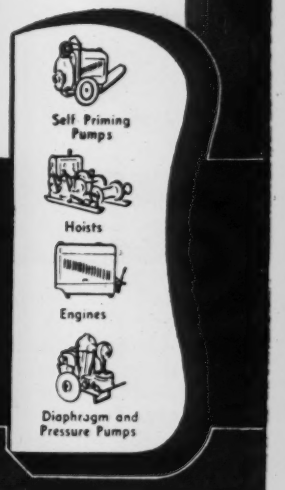

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PUBLIC BUILDINGS (Low Bidders, Cont'd.)

Calif., Long Beach—City Gas Dpt., City Hall, May 29, gas compressor station, incl. auxiliaries equip., bldgs., etc., Cherry Ave. and 70 St., Spec. C-647, from Oilfield Constr. Co., 2650 Cherry Ave., **$208,700.** CD 5/9—ENR 5/17.

★**†Ill., Chicago**—Chicago Housing Auth., 343 S. Dearborn St., June 6, 2 and 3 story, brick housing, Ill. 2-8, bounded by 37, 38, Princeton and Wentworth Sts., for NHA, from Sherry-Richards Co., 201 N. Wells St., **$2,512,500.** Est. $2,000,000. CD 5/17—ENR 5/24.

La., Alexandria—City, June 4, municipal abattoir, from B. Brezner, Alexandria, **$62,800.** CD 5/14—ENR 5/17.

†Okla., Chickasha—U. S. Eng., 231 W. Main St., Denison, Tex., hearing clinic bldg., Ser. 34-066-45-51, from Bobb-Musick Co., Box 207, Amarillo, Tex. **$81,000.** CD 5/29—ENR 6/7.

Tex., Houston—City, M. H. Westerman, secy., City Hall, May 30, auditorium renovation, from Bace-Marshall Constr. Co., 4009 Center St., **$52,900.** Est. $50,000. M. J. Sullivan, 3901 Travis St., archt. CD 5/25—ENR 5/31.

CONTRACTS AWARDED

†Ala., Anniston—U. S. Eng., Grant St. west of Westwood St., Mobile, Zone 7, tank repair shop at Ordnance Depot, to Rust Engineering Co., Liberty Life Bldg., Birmingham, **$124,768.**

†Calif., Campo—U. S. Eng., 751 S. Figueroa St., Los Angeles, Zone 55, power plant, recreation facilities, electric distr. sys., to Del E. Webb Co., 408 S. Spring St., Los Angeles, **$159,914.** Awarded 5/31. CD 5/15—ENR 5/17.

★**†Calif., Oakland**—Yards & Docks, Navy Dpt., 18 St. and Constitution Ave. N.W., Wash. 25, D. C., fleet post office bldg., West Terminus, 34 St., Spec. 16447, NOY 12210, to Dinwiddie Constr. Co., Crocker Bldg., San Francisco, **$605,600.** CD 5/29, under LB.

†Colo., Denver—U. S. Eng., 909 17 St., Denver, hospital, incl. new processing plant, reconversion bldgs., dismantling and reconstructing 14 bldgs., to Brown-Schrepferman & Co., 240 Washington St. Est. **$400,000.**

†Ind., Fort Benjamin Harrison (br. Indianapolis)—U. S. Eng., 612 Federal Bldg., Louisville 1, Ky., disciplinary barracks, Contr. W-15-029-eng-828, to W. A. Sheets & Sons, Inc., 1057 Osage St., Fort Wayne, **$196,991.**

†Kansas—U. S. Eng., 10 E. 17 St., Kansas City 8, Mo., supersonic scanning houses, rest houses and barricades, walks, etc., Sunflower Ordnance Works, Contr. W-23-029-eng-846, Johnson Co., to Peter Kiewit Sons' Co., 1024 Omaha National Bank Bldg., Omaha, Neb., **$45,472.**

★**†Md., White Oak**—Yards & Docks, Navy Dpt., 18 St. and Constitution Ave. N.W., Wash. 25, D. C., explosive laboratory at Navy Ordnance Laboratory, to Charles H. Tompkins Co., 907 16 St. N.W., Wash., D. C., **$739,300.** CD 6/5—ENR 6/7, under LB.

★**†Nev., Hawthorne**—Yards & Docks, Navy Dpt., 18 St. and Constitution Ave. N.W., Wash. 25, D. C., addnl. low cost housing and personnel facilities, Naval Ammunition Depot, NOY 11951, to Johnson-Drake & Piper, Inc., 1736 Franklin St., Oakland 12, Calif., **$1,077,121.** CD 6/4, under LB.

Pa., Mechanicsburg—Yards & Docks, Navy Dpt., 18 St. and Constitution Ave. N.W., Wash. 25, D. C., conversion Storehouse 31 for office space, Naval Supply Depot, NOY 12149, to H. B. Alexander & Son, 3 and Vaughn Sts., Harrisburg, **$149,974.**

†Tex., Texarkana—Pub. Housing Auth., NHA, 1411 Electric Bldg., 7 and Lamar Sts., Fort Worth, 100 family units, Tex. 41699, to Atlas Constr. Co., Texarkana, **$289,678.** CD 4/19—ENR 4/26.

★**†T. H., Oahu**—Pub. Housing Auth., NHA, 760 Market St., San Francisco, Calif., 518 dwelling units and No. 120 community bldg., to Pacific Constr. Co., Honolulu, **$1,755,281;** 482 dwelling units, TH 51031, to James W. Glover, Honolulu, **$1,492,392.** CD 1/5—ENR 1/11.

Alta., Edmonton—Wartime Housing, Ltd., 55 York St., Toronto, Ont., 100 houses for veterans, 97 and 99 Sts., and 76 to 82nd Aves., to Bennett & White, Birks Bldg., about **$330,000.** CD 3/20—ENR 3/22.

Ont., Kingston—Governors of General Hospital, Kingston, 126 bed hospital wing to M. Sullivan & Son, Ltd., Arnprior. Est. **$425,000.**

COMMERCIAL • BUILDINGS

PROPOSED WORK

Calif., Oakland—Owner, c/o F. H. Reimers, archt., 233 Post St., San Francisco, 3 story, rein.-con. apartment containing 4 apartments, $175,000.

Calif., San Bernardino—A. R. Pedder, 2708 I St., 45 frame, stucco dwellings in new subdivision near Highland Ave. and Lincoln Dr. $225,000.

Conn., Bridgeport—Elwood and Charles Randolph, 955 Main St., plans by Lyons & Mather, 211 State St., brick garden type apartment bldgs., Park Pl. and Myrtle Ave. $150,000.

COMMERCIAL BUILDINGS (Proposed Work, Cont'd.)

Ill., Chicago—Illinois Institute of Technology, 3300 S. Federal St., plans by Holabird & Root, 333 N. Michigan Ave., 2 story, brick, concrete, steel class room bldg., 32 and State St. $300,000.

★**La., Alexandria**—Baptist Hospital, Alexandria, plans by Neild, Somdal & Neild, City Bank Bldg., Shreveport, 100-bed hospital $631,660. CD 1/9—ENR 1/11.

La., Baton Rouge—Our Lady of the Lake Sanitorium, Across Dike, Baton Rouge, plans by Rodman & Murrell, 713 Reymond Bldg., hospital, $201,400.

La., New Orleans—R. W. Layer & P. P. Cazale, archts, 8 Marlborough Gate, soon lets contract 1 story, 82x115 ft., brick, stone monumental office bldg., rein.-con. and pile fdn., S. Dorgenois and Gravier Sts., for Falstaff Brewing Corp., 2600 Gravier St.

★**Ore., Salem**—Memorial Hospital (formerly Deaconess Hospital), Salem, plans by W. E. Kelley, 808 S.E. 28 Ave., Portland, 5 story, bsmnt., 136x160 ft. rein.-con. hospital, $500,000; 5 story, bsmnt., 58x82 ft. nurses home, $200,000; powerhouse. CD 5/8—ENR 5/10.

Tex., Fort Worth—St. Joseph Hospital, 1401 S. Main St., plans by R. Woltz, D. Waggoner Bldg., 60x100 ft., brick hollow tile laundry plant, $40,000.

Tex., Houston—Wilkin, Parker Lumber Co., 801 Rosine St., bids soon. 26 asbestos siding bungalows, $200,000.

Tex., Odessa—Permain Building Co., Odessa, office bldg. $400,000.

Tex., Odessa—Jno. W. Perry and R. O. Canon, Odessa, plans by Haynes & Strange, 415 Myrick Bldg., Lubbock, 8 story, bsmnt., brick, rein.-con., steel stores and office bldg. $450,000. CD 12/11—ENR 12/28, under Postwar projects.

Wis., Ft. Atkinson—1st Congregational Church, Ft. Atkinson, plans by J. J. Flad & T. H. Flad, assoc. archts., 133 Langdon St., Madison, 1 story, bsmnt., 112x150 ft., brick, tile steel truss church and parsonage, concrete fdn.

Alta., Calgary—Mount Royal College, c/o Principal Rev. J. H. Garden, Calgary, college bldg. as memorial to Dr. George Kerby, $150,000.

★**N. B., Moncton**—Sisters of the Good Shepherd, Moncton, plans by R. A. Frechette, 30 Bonacord St., constructing Home of the Good Shepherd, Archibald St. About $500,000.

CONTRACTS AWARDED

Calif., Los Angeles—Avalon Housing Co., 10,780 W. Pico Blvd., 45 single family dwellings, Willowbrook Dist., Los Angeles Co., **$190,000;** 61 five and six room frame, stucco dwellings, scattered locations, southwestern portion of Los Angeles Co., **$205,290.** Owner builds.

Calif., San Francisco—Lindell Co., 824 Taraval St., 36 residences, to C. T. Lindsay, 824 Taraval St. Est. **$162,000.**

Conn., West Hartford—Henry Realty Co., 68 Pratt St., Hartford, 5 story, 95x135 ft., brick apartment, Front Brook Dr., to Brooklawn Constr. Co., 68 Pratt St., Hartford. Est. **$150,000.** J. Berenson, 48 Forest St., Hartford, archt.

Pa., Camp Hill—H. Chertcoff, 1040 Buchanan Ave., Lancaster, brick, stone, marble motion picture theatre, provision being made for television bldg., completely air-conditioned, to P. A. Martin, Mt. Joy, **$150,000.** William Lynch Murray, 1100 North Second St., Harrisburg, archts.

Pa., Phila—Eson Co., Inc., 1023 Bankers Securities Bldg., 54 single family homes and 8 duplex apartments, separate contracts, **$350,000-$400,000.** I. W. Levin, 1531 Belmont Ave., archt.

Tex., Houston—C. O. Beeler & Associates, 1006 Evergreen Dr., 20 dwellings. Owner builds. **$150,000.** CD 5/23—ENR 5/31.

Tex., Houston—Jno. D. Townsend, Jr., 3663 Del Monts St., 24 unit duplex-apartment. Owner builds, **$150,000.** CD 6/6.

Tex., Houston—O. K. Theatres, Inc., c/o Lindale Theatres, E. Montgomery Rd., 2 theatre units, to F. W. Sharp Constr. Co., 2407 Stanmore St., approx. **$150,000.**

★**Wash., Seattle**—Balch-Setzer, Inc., 6800 48 Ave. N.E., Zone 5, eighty 1½ story, bsmnt., frame houses in area between 25 and 30 Aves. N.E., E. 70 and 75 Sts., day labor. **$500,000.** Thomas, Grainger & Thomas, Arcade Bldg., 2 and Union Sts., Zone 1, archts. A. Hitchings, Arctic Bldg., 3 and Cherry St., Zone 4, engr. CD 5/4—ENR 5/10.

★**Ont., Islington**—Thorncrest Development Co., Ltd., 1804 Victory Bldg., Richmond St. W., Toronto, 180 houses for Thorncrest Model Village, to Scott-Jackson Constr. Co., Ltd., Evans Ave., New Toronto, about **$800,000.**

Ont., Kingston—Kingston General Hospital Bd., H. F. Armstrong, supt., Kingston, 4 story, 55x140 ft., concrete, steel hospital wing, to M. Sullivan & Son, Ltd., 234 Elgin St., Arnprior, about **$300,000.** Drever & Smith, 81 Brock St., archts. CD 5/2—ENR 5/10.

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INDUSTRIAL BUILDINGS

PROPOSED WORK

★**Calif., San Francisco**—BUS TERMINAL etc.—Pacific Greyhound Lines, Pine and Battery Sts., 4 story bus terminal on site of present terminal, $850,000; maintenance shops, on recently acquired property, $850,000.

Calif., San Jose—WAREHOUSE, etc.—Carl N. Swenson Co., 355 Stockton Ave., warehouse, storage shed and modern offices. $50,000.

★**Calif., San Jose**—PLANT—International Minerals & Chemical Co., F. H. Catterson, resident production mgr., San Jose, monsodium glutamate from sugar beet pulp residue production plant, 260 acre site, Monterey Rd. $1,000,000.

Calif., Vallejo—BUS TERMINAL—Pacific Greyhound Lines, Pine and Battery Sts., San Francisco, modern bus terminal on site of present depot. $150,000.

Conn., Bridgeport — SUB STATION — United Illuminating Co., 1115 Broad St., sub station, transformer equip., Clinton Ave. Over $40,000.

Ga., Atlanta — FACTORY, etc. — Draper Corp., c/o W. M. Mitchell, mgr., 242 Forsyth St. S.W., processing textile factory and warehouse on 8 acre tract, Murphy Ave. $300,000. Robert & Co., Bona Allen Bldg., engrs.

Ill., Chicago — FACTORY — Regensteiner Corp., 310 S. Racine Ave., plans by Alschuler & Freidman, 28 E. Jackson Blvd., factory addn., 310 S. Racine Ave. and 1224 W. Van Buren St.

Ill., Chicago—SERVICE—New York Central System, S. E. Armstrong, ch. engr., 466 Lexington Ave., New York, N. Y., soon lets contract 2 story, 35 x 285 ft., brick, concrete, steel Root St. Coach Service Bldg. Over $150,000.

Ind., Richmond — PLANT — Automotive Gear Co., S. 8 and C. & O. R. R., plant addn. $100,000 or more with equip.

Ind., Terre Haute—LABORATORY, etc.—Commercial Solvents Corp., 1331 S. First St., plans completed by Miller & Yeager, 200 Opera House Bldg., and bids soon 3 story bsmnt., 58x139 ft. rein.-con. laboratory and office addn. $350,000.

★**Md. Relay**—PLANT—Jos. Seagram & Son, 7 St. Rd., Louisville, Ky., plans by Smith, Hinchman & Grylls, Marquette Bldg., Detroit, Mich., boiler plant. $500,000.

Minn., Collegeville—POWER PLANT— St. John's College, Rev. G. Winkleman, Collegeville, soon lets contract power plant $50,000. Toltz, King & Day, 1509 Pioneer Bldg., Minneapolis, engr.

★**Okla., Ponca City**—POWER PLANT—Continental Oil Co., Ponca City, power plant expan. $585,360.

Pa., Lancaster—PLANT—Armstrong Cork Co., Lancaster, soon lets contract plant. W. J. Lee, 1505 Race St., Phila., archts. CD 10/13—ENR 10/19.

Tex., Abilene—PLANT—Independent Ice & Refrigeration Co., Abilene, plans by Hughes & Olds, 158½ Cypress St., ice plant, brick, rein.-con., $40,000.

Tex., Chapman Ranch—STORAGE FACILITIES—J. O. Chapman, Chapman Ranch, grain storage facilities. $232,114.

Tex., Childress—WAREHOUSE—Panhandle Compress & Warehouse Co., Lubbock, warehouse. $20,000-$40,000.

Tex., Houston—SHOP—Baker Oil Tool Co., 6023 Navigation Blvd., 1 story, masonry tool shop addn. $40,000.

Tex., Houston—PLANT—A. O. Smith Corp., Industrial Rd., vessel plant annex, $50,000.

Tex., San Antonio—WAREHOUSE, etc.—K. O. Electrical Steel Co., 103 Humble St., soon lets contract 1 story, 43 x 128 ft., concrete, masonry type warehouse and shop, $40,000. Matthews & Kenan, 1615 Transit Tower Bldg., engrs.

Tex., Sudan — WAREHOUSE — Lubbock Compress & Warehouse Co., Lubbock, warehouse. $72,000.

West Virginia—PLANT ADDITIONS—Hope Natural Gas Co., Clarksburg, installing absorbers, de-ethanizer, still, condensers, heat exchangers and other equip. in Hastings gasoline plant, Wetzel Co., $300,000; 1,000 hp. gas compressor with auxiliary equip., at Cornwell compressor station in Kanawha Co., $87,958; natural-gas dehydration plant and appurtenant facilities at Stonewall Jackson compressor station, Kanawha Co., $35,000.

Wis., Prairie du Chien—PLANT—Wisc. Co-op. Farm Plant Foods, 18 S. Thornton Ave., Madison, bids soon, removing present bldg. and moving to new site, 1 and 2 story, 266 x 273 ft., steel concrete plant, 1 story, 30 x 80 ft., concrete block garage. $180,000, incl. equip. J. K. Johnson, 1 N. La Salle St., Chicago, Ill., engr. CD 4/18—ENR 4/26.

Ore., Albany—PLANT—Associated Frozen Food Packers, Inc., c/o Pacific Frozen Foods, Inc., Northern Life Tower, 3 and Seneca Sts., Seattle 1, Wash., quick-freezing plant, to C and H Constr. Co., 52 Ave. S. and Brighton St., Seattle 8, Wash. Est. $100,000.

Ore., Drain — SAWMILL — E. Whipple & Son, Drain, rebuilding sawmill, day labor, $50,000. CD 5/25—ENR 5/31.

Ore., Springfield—PLANT—Guerrier Lumber Co., Springfield, 40 x 236 ft. veneer plant, to M and M Woodworking Co., 2301 N. Columbia Blvd., Portland. Est. $73,058. CD 6/5—ENR 6/7.

Ore., Sweet Home—SAWMILL—Santiam Lumber Co., Sweet Home, reconstructing sawmill, day labor, $205,000. CD 5/29—ENR 5/31.

Tex., Dallas—PLANT—Adleta Show Case & Fixture Mfg. Co., 1900 Cedar Springs Rd., 2 story, 100 x 140 ft., brick, steel, rein.-con. mfg. plant bldg., to Cowdin Bros., 411 S. Haskell St., $95,000. CD 5/28, under Post-war Projects

Ont., Leaside (Toronto)—MILL—Adamson & Morgan, archts., 3 St. Thomas St., Toronto, soon let contract 3 story, bsmnt., 40 x 50 ft., mill, 1 story 50 x 120 ft. warehouse, 1 story, 50 x 56 ft. office, steel, brick, tile, Wickstead Ave., for J. R. Short Milling Co. (Canada) Ltd., 80 King St. W., Toronto. $85,000.

Ont., Toronto—FOUNDRY—Hornwood & White, archts., 229 Yonge St., soon let contracts 2 story, 30 x 100 ft., brick foundry, main office, cupola, etc., Davenport Works, 940 Lansdowne Ave., for Canadian General Electric Co., Ltd., 212 King St. W., $175,000 incl. equip. CD 5/3—ENR 5/24.

P. E. I., Charlottetown—PLANT—Maritime Electric Co., Ltd., Charlottetown, plant alterations, etc. About $188,000.

Que., Bourlamaque — DIAMOND DRILLING — Bourlamaque Central Mines, Ltd., Bourlamaque, diamond drilling, $70,000. J. P. Norrie, Ames, engr.

Que., Bourlamaque — DIAMOND DRILLING—Wildor Gold Mines, Ltd., Bourlamaque, diamond drilling. $62,500. F. Smith, c/o owner, engr.

Que., Chandler — PLANT — Gaspesia Sulphite Co., Ltd., 10 blvd des Capucins, Quebec City, plant exten. $250,000. R. J. Chambers, c/o owner, engr.

Que., Levis—PLANT—Herve Barlheau, 122 St. Georges St., plant. About $40,000.

Ont., Midland—PLANT—Fine Silk Ltd., 4 St., plant addn. $49,200.

Que., Quebec West—SLAUGHTER HOUSE—Cooperative Federee de Quebec, 130 St. Paul St. E., Montreal, plans by L. Mainguy, 105 Cote de La Montague, Quebec City, slaughterhouse. About $75,000.

Que., Quebec City—GARAGE—J. L. Drolet Automobiles, Ltd., 450 Charest Blvd., garage. $50,000.

Que., St. Tite—FACTORY—P. A. Roy Reg'd., St. Tite, slipper and shoe factory. $40,000.

Que., Thurso—PLANT—Singer Mfg. Co. Ltd., 165 St. Paul St., St. Johns, plant extens. $400,000. T. Pringle & Son Ltd., 485 McGill St., Montreal, engr.

Que., Victoriaville—ABATTOIR—Group of Cooperatives, Victoriaville, plans by L. Mainguy, 105 Cote de La Montague, Quebec City, abattoir. About $60,000. CD 5/4—ENR 5/10.

Que., Ville St. Pierre—FACTORY—Automatic Works, Ltd., Sun Life Bldg., Montreal, plans by Perrault & Gadbois, 3795 Van Horne Ave., Montreal, factory. $50,000.

Ont., Leamington—PLANT—Lealand Co. Ltd., Culver St., Simcoe, soon lets contract 2 story, 81 x 110 ft., tomato processing plant, rein.-con., frame, tile, rein.-con. fdn. Over $40,000.

BIDS ASKED

Bids Asked June 18

Conn., Plainfield — FACTORY — Plastic Film Corp., c/o L. F. Caproni, archt., 122 Chapel St., New Haven, 1 story, 42x200 ft., brick, steel, concrete factory addn., 4 rein.-con. silos and 30x100 ft. platform. Harrigan & Hill, 37 Whitney Ave., New Haven, engrs. CD 5/25—ENR 5/31.

Bids Asked After July 1

Tex., Beaumont — SHOP — International Derrick & Equip. Co., Beaumont, 60x90 ft. shop. M. R. Van Valkenburgh, 6451 Main St., Houston, engr.

Bids Asked About August 2

Calif., Los Angeles—PLANT—Owner, c/o A. C. Martin, archt., 233 Higgins Bldg., steel processing plant and office, Bandini Blvd., in Bandini Dist. $300,000.

Bids Asked

Conn., Stamford—FACTORY, etc.—Electronic Rubber Co., 69 Sunnyside Ave., 1 story, bsmnt., 50 x 150 ft., brick, concrete factory and boiler plant. D. Mansell, 24 Park Row, archt. CD 5/14—ENR 5/17.

Ill., Belvidere—PLANT—Belvidere Distilling Co., 310 Columbia Ave., feed recovery plant. $350,000. United Engineers & Constructors, Inc., 1401 Arch St., Phila., Pa., engrs. CD 5/2—ENR 5/10.

INDUSTRIAL BUILDINGS (Cont'd.)

LOW BIDDERS

Tex., Houston—FACTORY—South Texas Casket Co., Box 5064, Dallas, 1 story, 80 x 180 ft., concrete tile, steel factory, 3600 block Polk St., from R. F. Ball Constr. Co., Box 1451, **$65,983.** CD 5/29—ENR 6/7.

CONTRACTS AWARDED

Calif., Anaheim—WAREHOUSE—So. Calif. Citrus Foods Co., 1460 N. Olive St., 1 story, 100 x 175 ft., reinforced brick warehouse, 1460 N. Olive St., to J. A. McNeil, 714 W. Olympic Blvd., Los Angeles, approx. **$65,000.** A. C. Martin, 233 Higgins Bldg., Los Angeles, archt.

Calif., Long Beach — WAREHOUSE — United Mill Products Co., Long Beach, 100 x 128 ft., rein.-con. warehouse, Hester St. Owner builds. **$50,000.** J. J. Jones, Farmers & Merchants Bank Bldg., archts.

★**Calif., Mentone** — FACTORY — Universal Sanitary Mfg. Co., Newcastle, Pa., plumbing fixture mfg. plant, to P. J. Walker Co., 3900 Whiteside Ave., Los Angeles, approx. **$500,000.** Taylor & Barnes, 803 W. 3 St., Los Angeles, engr.-archt.

★**Calif., Torrance**—PLANT—General Petroleum Corp., 108 W 2 St., Los Angeles, delayed coking plant at refinery, to M. W. Kellogg Co., 609 S. Grand Ave., Los Angeles, approx. **$3,049,000.**

Conn., Cos Cob—STORAGE UNIT—The New York, New Haven & Hartford R. R. Co., E. E. Oviatt, ch. engr., Water St., New Haven, brick storage bldg., power station, to Mertz Brothers, 145 Horton Ave., Port Chester, N. Y. Est. **$45,000.** Bids 5/22. CD 12/12—ENR 12/14.

Conn., Hartford — FACTORY — Han-Dee Spring & Mfg. Co., 2074 Park St., brick factory alterations, addns. to Associated Constr. Co., 195 Thames St., Groton. Est. **$40,000.** Golden-Storrs & Co., 343 Fairfield Ave., archts.

Conn., Unionville — FACTORY — Hartford Spinning, Inc., 98 Main St., brick factory addns., alterations, to Associated Constr. Co., 195 Thames St., Groton. Est. **$40,000.** Buck & Buck, 650 Main St., Hartford, engrs.

★**Ill., Chicago** — PLANT — Commonwealth Edison Co., 72 W. Adams St., bldgs. for 107,000 kw. Calumet Generating Plant, brick, rein.-con., steel, to Herlihy Mid-Continent Co., 140 S. Dearborn St. Est. **$11,000,000.** Holabird & Root, 333 N. Michigan Ave., archts. Sargent & Lundy, 140 S. Dearborn St., engrs.

Ill., Chicago Heights—WAREHOUSE, etc. —Keystone Asphalt Products Co., 43 E. Ohio St., Chicago, 1 story, 100 x 300 ft., brick, concrete, steel warehouse and asphalt products bldg., to Kaiser-Ducett Co., 80 E. Jackson Blvd., Chicago, around **$100,000.**

Idaho, Pocatello—PLANT—Simplot Fertilizer Co., Pocatello, steel, rein.-con. phosphate rock crushing plant, day labor. **$100,000.** McClelland & Jones, Republic Bldg., 3 and Pike Sts., Seattle 1, Wash., archts.

Ind., Indianapolis—FACTORY—Paper Art Co., H. L. Wooten, secy., 1005 Meridian St., 1 story, brick, concrete block, etc. factory, to Krebay Constr. Co., 108 E. 9 St., **$100,000** cost plus. Allen & Kelley, 435 Archts. & Bldrs. Bldg., archts.

Mass., Brighton (sta. Boston)—GARAGE—Diamond T Sales & Service Corp., 10 Glenville Terrace, Allston, 1 story, 75x220 ft., concrete, brick, steel garage, to D. S. Tait, 380 Pleasant St., Belmont, approx. **$40,000.** CD 6/4—ENR 6/7.

Mass., Fall River—FACTORY—Firestone Rubber & Latex Corp., Firestone Ave., altering Factory Bldgs. 11, 6 and 23, constructing passageway. Owner builds. **$40,000.**

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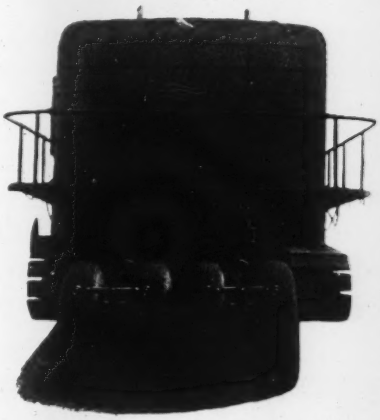

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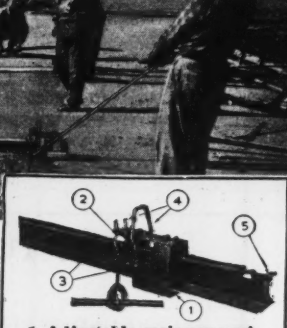

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INDUSTRIAL BLDS. (Contracts Awarded, Cont'd.)

Mass., Gardner—FACTORY—Simplex Time Recorder Co., 26 South Lincoln St., 1 story, brick, steel factory. Owner builds. **$40,000.** S. G. Kendall, 32 Pleasant St., archt. CD 6/4—ENR 6/7.

Mass., Indian Orchard—PLANT—Monsanto Chemical Co., 704 Monsanto Ave., 4 story, bsmnt., 40 x 80 ft., brick, concrete addn. to west side Resinox Bldg., to J. G. Roy & Sons Co., 21 Silver St., Springfield. **$55,000.** J. R. Worcester & Co., 79 Milk St., Boston, engrs.

Mass., Watertown—FACTORY, etc.—Manning, Maxwell & Moore, Inc., 11 Elias St., Bridgeport, Conn., and 25 Watson St., Boston, brick, steel factory and office bldg., Grove St., to Stone & Webster, Inc., 49 Federal St., Boston. Est. over **$40,000.**

Me., Fort Kent—WAREHOUSE—Daigle & Daigle, Fort Kent, 2 story, frame, concrete bsmnt. warehouse and hardware and furniture store. Owner builds. **$60,000.** E. W. Tarbell, 84 Harlow St., Bangor, archt.

Md., Baltimore—PLANT—Rustless Iron & Steel Corp., 1000 Edison Hy., mfg. plant addns., to Cummins Hart Constr. Co., 2023 N. Charles St., **$193,000.**

N. J., Hackensack—PLANT BLDGS.—Sun Oil Co., 1608 Walnut St., Phila., Pa., distr. bldg. addn. and garage and office bldg., to Wortmann & Sons, Inc., 109 E. 29 St., New York, N. Y. Est. **$50,000.** CD 2/27—ENR 3/1.

Tex., Dallas—SHOP, etc.—Bankstown-Hall Motors, 2311 Main St., 1 story, bsmnt., 240 x 300 ft., brick, steel, rein.-con. mechanical shop and storage, to Cowdin Bros., 411 S. Haskell St., approx. **$156,000.** Bids 5/7. CD 5/1—ENR 5/3.

Tex., Edinburg—PLANT—Donna Fruit Co., 622 N. Closner St., 1 and 2 story, concrete, sheet metal, brick, steel vegetable and citrus packing plant, to H. E. Tewell, 316 W. Germanston St., approx. **$95,000.**

Tex., Houston — PLANT — Basen Steel Works, 3118 Harrisburg St., steel plant storage and shop bldg., 300 ft. conveyor for loading structural steel, to G. H. Stubblefield, Citizens State Bank Bldg., approx. **$50,000.** CD 6/6.

Tex., McAllen—PLANT—Valley Ready Mix Concrete Co., Fair Park Rd., Harlingen, 1 story, brick, rein.-con. plant, day labor. **$40,000.** CD 6/6.

Wash., Mesa—GRAIN ELEVATOR—Connell Grain Growers, Inc., Connell, 100,000 bu. grain elevator, to H. Hagman, Cashmere. **$63,041.**

Wis., Milwaukee — WAREHOUSE — Fred Olson & Son, 708 W. Virginia St., Zone 4, 1 story, 100 x 140 ft., steel, brick warehouse terminal, concrete fdn., to Hunzinger Const. Co., 4541 N. 124 St., Zone 13. H. Messner, 231 W. Wisconsin Ave., one Zone 3, archt.

Wis., Racine—LOCKER ROOM—Belle City Malleable Iron Co., 1442 Forest St., 2 story, 76 x 280 ft., brick, concrete block, glazed tile locker room bldg., concrete fdn., to Nelson & Co., Inc., 1550 Yont St. E. A. Klinger, 612 14 St., archt.

Wis., Racine—FACTORY—E. & R. Mfg. Co., St. Patrick and Frederick Sts., 1 story, 60 x 170 ft. and 32 x 42 ft., concrete block, steel truss factory addns., concrete fdns., to P. Olson, 904 Belmont St. A. J. Seitz, 423 Main St., archt.

Wis., Sheboygan—SHOP—Polar Ware Co., Lake Shore Rd., 2 story, 24 x 130 ft., brick, concrete block, structural steel shop addn., concrete fdn., to J. Houmes, 617 Erie Ave. E. A. Stubenrauch, 708 Erie Ave., archt.

Alta., Edmonton—PLANT—Taylor & Pearson, Ltd., 10215 103 St., bldg. addn., to H. G. MacDonald, 612 Tegler Bldg., **$44,917.** G. H. MacDonald, 834 Tegler Bldg., archt. CD 6/1—ENR 6/7.

Alta., Lethbridge — WAREHOUSE — T. Eaton Co., Ltd., Portage and Donald Sts., Winnipeg, warehouse, to Bird Constr. Co., Ltd., Lethbridge, about **$54,000.** Meech & Meech, 114 McFarland Bldg., archts. CD 4/18—ENR 4/26.

B. C., Vancouver—PLANT—Alberta Wheat Pool, Calgary, Alta., grain sacking plant, to Commonwealth Constr. Co., Ltd., 670 Taylor St., about **$90,000.** CD 1/12—ENR 1/18.

N. B., Moncton—BAKERY—Lane's Bakeries, Ltd., Moncton, 1 story, 140x150 ft., concrete, brick, tile bakery addn., to Parsons Constr. Co., Ltd., Imperial Block, Moncton, about **$94,200.**

Ont., Hamilton—PLANT—Dominion Glass Co., Ltd., Chapple St., plant bldg. repairs, to W. H. Cooper Constr. Co., Ltd., Medical Arts Bldg., about **$50,000.**

Ont., Toronto — PLANT — Consolidated Press, Ltd., 73 Richmond St. W., renovating of bldg., at 56 Duchess St., to Clarke Constr. Co., Ltd., 215 Sherburne St., about **$100,000.** E. A. Cross, 991 Bay St., engr.

Ont., Toronto—FACTORY—Fine Chemicals of Canada, Ltd., 587 Fleet St. W., factory, Pharmacy Ave., to Chestnut-McGregor, Ltd., 96 Bloor St. W., about **$90,000.** CD 5/25—ENR 5/31.

INDUSTRIAL BUILDINGS (Contracts Awarded, Cont'd.)

Ont., Toronto—FACTORY—Massey-Harris Co., Ltd., 915 King St. W., factory, to A. W. Robertson, Ltd., 57 Bloor St. W., about **$1,000,000.**

Ont., Toronto (Mt. Dennis)—FACTORY—Arrow-Hart & Hegeman (Canada) Ltd., 310 Spadina Ave., Toronto, 2 story, 50x300 ft., steel, brick factory, concrete fdn., Industrial St., to Cloke Constr., Ltd., 215 Sherbourne St., about **$150,000.** Ewart, Armer & Byam, Excelsior Life Bldg., Toronto, engrs.

Que., St. Gertrude—FACTORY—La Cooperative de Fromage de Ste. Gertrude, Ste. Gertrude, cheese factory, to A. Masse, Ste. Gertrude, about **$50,000.** CD 10/4—ENR 10/12.

Que., Ville La Salle—PAPER MILL—Builders Products Ltd., 240 St. Patrick St., addnl. paper mill exten., to L. Gordon-Tarlton Ltd., 912 McEachern Ave., Outremont, **$354,500.**

Que., Quebec City—ABATTOIR—Abattoir de Quebec Incorp., 255 Fifth St., M. Lemelin, pres., 3 story, 34 x 118 ft., rein.-con. abattoir, Destimauville St., to F. X. Lamontagne, 411 Blvd. Charest, Quebec City, about **$100,000.** L. Dufresne, 8 Longueuil St., engr.

Ont., London—COLD STORAGE PLANT—A. Limon, 61 Windsor Ave., 1 story, 60 x 85 ft., brick, concrete, special insulation, cold storage plant, to J. Hill, 216 Raymond Ave. Est. **$45,000.** Awarded 5/30. D. Hennigar, London Life Bldg., archt.

Que., Ormstown—PLANT—Textiles, Ltd., Guelph, spinning plant, near C. P. R. Station, to J. L. E. Price & Co. Ltd., 680 Sherbrooke St. W., Montreal, **$100,000** plus. H. R. Wiggs, archt. and G. L. Wiggs, engr., both 660 St. Catherines St. W., Montreal.

UNCLASSIFIED

PROPOSED WORK

†**Ariz., Tucson**—BOMB SCORING DEVICES—U. S. Eng., 751 S. Figueroa St., Los Angeles, 55, Calif., rejected bids May 4, 5 sonic bomb scoring devices at Davis-Monthan Field, No. 297. CD 5/9—ENR 5/17, under LB.

★†**California** — SHIPPING FACILITIES — U. S. Eng., 74 New Montgomery St., San Francisco, Zone 19, Bay Area Shipping Facilities, incl. two 2-berth concrete piers connected to shore by trestles over shallow water and storage yards at California Point and Ignacio; barracks-type housing is to be provided for operating personnel, $13,000,000.

★†**Calif., Santa Ana**—AIR BASE BLDG.—U. S. Eng., 751 S. Figueroa St., Los Angeles, Zone 55, conversion barracks for Convalescent Hospital, at Santa Ana Army Air Base, $616,230.

★†**Ga., Chatham Airfield (br. Savannah)**—AIRFIELD IMPROVEMENTS — U. S. Eng., Post Office Bldg., Savannah, airfield imprvs., incl. reconstructing approx. 143,000 sq. yd. parking apron; north-south and east-west runways; approx. 78,000 sq. yd. new parking apron; new taxiway, $3,750,000.

★†**Ga., Cochran Field (br. Macon)**—AIRFIELD BLDG.—U. S. Eng., Post Office Bldg., Savannah, construction, conversion for Convalescent Hospital. $767,578.

Illinois—SERVICE EXTENSIONS—Clinton County Electric Cooperative, Inc., Breese, service extens., Clinton Co. $45,000.

Illinois—SERVICE EXTENSIONS—Southern Illinois Electric Cooperative, Dongola, service extens., Pulaski Co. $75,000.

Iowa — SERVICE EXTENSIONS — Pella Cooperative Electric Assoc., Pella, service extens., Marion Co. $60,000.

Iowa — SERVICE EXTENSIONS — Sac County Rural Electric Cooperative, Sac City, service extens., Sac Co. $50,000.

Iowa — SERVICE EXTENSIONS — Woodbury County Rural Electric Cooperative Assoc., Moville, service extens., Woodbury Co. $50,000.

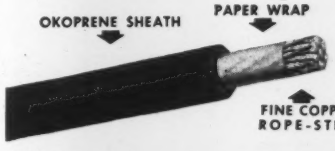
OKOCORD
welding cables
stay on the job longer

Okocord cables for welding transmit uninterrupted power under severe conditions. In the single conductor electrode-holder cable shown, fine copper wires are rope-stranded for greater flexibility. They give longer life because they are first stranded together on the Uni-lay principle, then "lubricated" by Okonite's special treatment. Increased flexibility results in better welding through easier, less tiring use of electrode-holder. Paper wrap over conductor leaves it clean for terminating, increasing flexibility still further. Additional mechanical strength is provided by seine twine cords embedded in an Okoprene sheath while the Okoprene protects against corrosion, resists oil, acids and alkalies.

Many other types of OKOCORD portable cords and cables cover a wide range of applications. The Okonite Company, Passaic, N. J.

OKOCORD ELECTRODE-HOLDER CABLE

Size A.W.G.	Number of Wires	Carrying Capacity Amperes	Volts drop 60° C. Copper Temp.
4	1078	100	3.18 per 100 ft.
3	1372	150	3.70 " " "
2	1715	200	3.92 " " "
1	2156	250	3.88 " " "
1/0	2695	300	3.72 " " "
2/0	3381	375	3.68 " " "
3/0	4263	450	3.51 " " "
4/0	5341	550	3.41 " " "



4096

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Hercules Piles — Caissons — Cofferdams
Arresting of Foundation Settlement
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Engineering Construction of All Types
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THOMAS HOISTS

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20 So. Hoyne Ave., Chicago, Illinois

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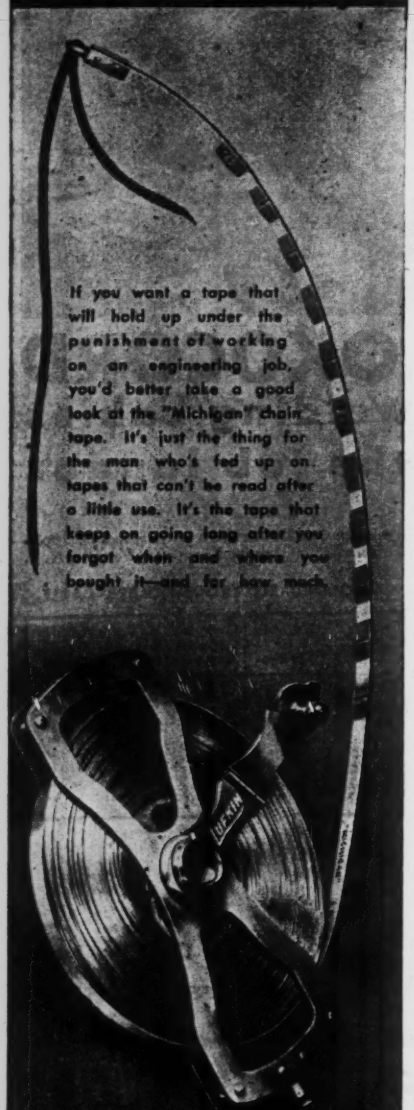
BABBITT TAPES


If you want a tape that will hold up under the punishment of working on an engineering job, you'd better take a good look at the "Michigan" chain tape. It's just the thing for the man who's fed up on tapes that can't be read after a little use. It's the tape that keeps on going long after you forgot when and where you bought it—and for how much.

WRITE FOR FREE CATALOG 12

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TAPES · RULES · PRECISION TOOLS

UNCLASSIFIED (Proposed Work, Cont'd.)

Louisiana — SERVICE EXTENSIONS — Beauregard Electric Cooperative, Inc., DeRidder, service extens., Beauregard Co. $40,000.

★**La., Opelousas** — AIRPORT — City, H. Weir, chn. Airport Comn., airport, $1,000,000.

†**Mass., Waquoit**—RECREATIONAL FACILITIES—U.S. Eng., 31 St. James Ave., Boston, Zone 16, recreational facilities, bldgs., etc., No. 19-023-45-Neg-143. $50,000.

Michigan — SERVICE EXTENSIONS — Cherryland Rural Electric Cooperative Assoc., Traverse City, service extens., Grand Traverse Co. $55,000.

Missouri—SERVICE EXTENSIONS—Intercounty Electric Cooperative Assoc., Licking,, service extens., Texas Co. $50,000.

Nebraska — SERVICE EXTENSIONS — Cedar-Knox County Rural Public Power Dist., Hartington, service extens., Cedar and Knox Counties, $50,000.

Nebraska — SERVICE EXTENSIONS — Stanton County Rural Public Power Dist., Stanton, service extens., Stanton Co. $40,000.

Ohio — SERVICE EXTENSIONS — Adams Rural Electric Cooperative, Inc., West Union, service extens., Adams Co. $60,000.

Ohio—SERVICE EXTENSIONS—Guernsey-Muskingum Electric Cooperative, Inc., New Concord, service exten., Guernsey Co. $375,000.

Ohio—SERVICE EXTENSIONS—Washington Electric Cooperative, Inc., Marietta, service extens., Washington Co. $396,000.

Oklahoma — SERVICE EXTENSIONS—Oklahoma Electric Cooperative, Norman, service extens., Cleveland Co. $50,000.

Pennsylvania—GAS ENGINE, etc.—New York State Natural Gas Corp., 545 Wm. Penn Way, Pittsburgh, 500 hp. gas engine and compressor, gas coolers, circulating pumps, suction and discharge lines, enlarging auxiliary bldg., and appurtenant equip., Tioga Co. $51,790.

★**Texas and Louisiana**—COAXIAL CABLE —American Telephone & Telegraph Co., 4100 Bryan St., Dallas, Tex., 8-coaxial cable between Dallas, Tex. and Shreveport, La. $600,000.

Texas—SERVICE EXTENSIONS—Jackson Electric Cooperative, Inc., LaWard, service extens., Jackson Co. $100,000.

Texas—SERVICE EXTENSIONS—Victoria County Electric Cooperative Co., Victoria, service extens., Victoria Co. $100,000.

★†**Tex., Fort Sam Houston** — PLAYGROUNDS, etc.—U. S. Eng., Fort Sam Houston, playgrounds, recreation and athletic facilities, incl. 5 recreation bldgs., softball diamonds, volley and tennis courts, golf driving range, boxing ring, basketball, badminton, shuffleboard and handball courts, etc., $900,000.

Tex., San Antonio—HANGARS—Union Bus Lines, 107 Kayton St., soon lets contract 2 steel, 30x284 ft. hangars, $65,000. W. N. Noonan, 720 Travis Bldg., archt. CD 5/10—ENR 5/31, under Postwar Projects.

Vermont—SERVICE EXTENSION—Halifax Electric Cooperative, Inc., Brattleboro, service extens., Windham Co. $50,000.

Virginia—SERVICE EXTENSIONS—BARC Electric Cooperative, Millboro, service extens., Bath Co. $50,000.

Virginia—SERVICE EXTENSIONS—Central Virginia Electric Cooperative, Livingston, service extens., Nelson Co. $50,000.

Wash., Vancouver—PLEASURE and FISHING CRAFT MOORING, etc.—C. E. Knight, Vancouver, mooring for pleasure and fishing craft, pier, 350 ft. narrow gage marine railway on Columbia River, near here. $40,000. D. I. Stewart, Central Bldg., archt.

West Virginia and Pennsylvania—PIPELINE, etc.—Manufacturers Light & Heat Co., Union Trust Bldg., Pittsburgh, Pa., 28 mi. 2-to 20-in. pipeline, three 600 hp. compressors at existing stations, Wetzel, Ritchie, Marshall, and Doddridge Counties, W. Va. and Washington, Lawrence, Jefferson, Beaver and Allegheny Counties, Pennsylvania.

Wisconsin—DISTRIBUTION SYSTEM—Richland Coop. Elec. Assoc., Richland Center, soon lets contract 46 mi. rural electrical distr. sys., Project Wisc-4-2035E 3-Richland. Plans deposit $5. Bids 5/22, relected. Wisconsin Elec. Coop., 303E, Wilson St., Madison, Zone 3, engrs. CD 4/18—ENR 4/26.

N. S. Amherst—OIL DRILLING—United States Oil Co. Inc., Amherst, oil drilling, minimum depth 15,000 ft. Nappan Area. $75,000.

Man., Winnipeg — AIRPORT — City (St. James-Winnipeg Airport Comn.), plans international airport, Stevensons Field. $200,000.

Man., Winnipeg—OVERHEAD TROLLEY SYSTEM—Winnipeg Electric Co., Notre Dame and Albert Sts., overhead trolley system. $68,000.

Ont., Toronto—OIL and GAS DEPOSITS DEVELOPMENT—Queenston Gas & Oil Co., Ltd., c/o W. S. Jenkins, K.C., 18 Toronto St., oil and gas deposit developments, $75,000.

BIDS ASKED

Bids Asked June 19

North Carolina—RURAL ELECTRIFICATION—South River Electric Membership Corp., Stedman, 473 mi. rural electrification, Cumberland Co. Plans deposit $25, from L. E. Wooten, consult. engr., Odd Fellows Bldg., Raleigh.

Bids Asked June 21

La., Denham Springs—GAS SYSTEM—Mayor and Bd. Alderman, natural gas distr. sys., exten. water sys. Extended date. Plans deposit $25. Barnard & Burk, 314 Triad Bldg., Baton Rouge, engr. CD 5/8—ENR 5/10, under BA.

Bids Asked June 22

N. Y., Summerville—DOCK REPAIRS—Div. Military & Naval Affairs, 112 State St., Albany, dock repairs, $29,000.

Bids Asked June 27

†**Idaho and Wyoming** — RADIO-TELEPHONE APPARATUS—Bureau Reclamation, Dpt. Interior, Court House, Denver, Colo., furnishing, del. f.o.b. cars, shipping point or railroad destination, 5 identical sets radiotelephone apparatus, each consisting of 1 transmitter and 1 receiver, together with antenna, accessories, etc. for use on Minidoka Project, Spec. 1776-D.

Bids Asked June 27

†**Wash., Oroville**—FILTER TRENCH—Pub. Bldg. Admin., U. S. Appraisers Bldg., San Francisco, Calif., installing filter trench at U. S. Border Station. Extended date.

Bids Asked June 28

Nebraska—TRANSMISSION LINE—Consumers Pub. Power Dist., at office Asst. Secy., 1452-25 Ave., Columbus, 37.5 mi. 33 kv 60 cycle, single circuit electrical transmission line, between District's existing substations at Johnstown and Valentine. V. M. Joohnson, genl. mgr.

Bids Asked June 28

†**N. D., Jamestown**—AIRPORT LIGHTING, etc.—Civil Aeronautics Admin., 608 S. Dearborn St., Chicago, Ill., airport lighting, incl. furnishing, installing tip over boundary marker light, dismantling and re-erecting beacon tower, etc.

Bids Asked June 29

Ky., Frankfort—RADIO STATION—State Hy. Dpt., Frankfort, 1 story, 24x24 ft. police radio station, brick, concrete fdn. for radio tower.

Bids Asked July 2

†**Ind., Bloomington** — AIRPORT — Civil Aeronautics Admin., 608 S. Dearborn St., Chicago, Ill., airport, incl. 200,000 cu. yd. grading, sewer pipe, miscellaneous drainage structures, seeding and fencing.

CONTRACTS AWARDED

★†**Ala., Maxwell Field (br. Montgomery)**—RUNWAYS, etc.—U. S. Eng., Grant St., west of Westwood St., Mobile, Zone 7, reinforcement, reconstructing runways and taxiways, to Wright Contg. Co., 504 25 Ave., Columbus, Ga., **$1,666,347.**

★†**Calif., Fairfield**—AIRFIELD IMPROVEMENTS—U. S. Eng. 1209 8 St., Sacramento, Zone 8, addnl. construction at Fairfield-Suisum Air Base, to Morrison-Knudsen Co., 111 Sutter St., San Francisco, and Stolte, Inc., 8451 San Leandro St., Oakland. Est. **$19,000,000.** CD 6/7.

★†**Calif., Moffett Field**—TAXIWAYS, etc. —Yards & Docks, Navy Dpt., 18 St. and Constitution Ave. N. W., Wash. 25, D. C., taxiways, apron, lighting and drainage, Naval Air Station, Spec. 16528, NOY 12298, to Johnson & Everist & Peter Kiewit Sons Co., 202 Atlas Bldg., San Francisco, **$936,031.** CD 6/7, under LB.

Calif., San Francisco — PIER FENDER LINES—Bd. State Harbor Comrs., Ferry Bldg., repairing fender lines of Pier 34, to Mercer-Fraser Co., 2 and Commercial Sts., Eureka, **$26,500.**

†**Calif., Terminal Island** — DRYDOCK CRANE BASES—Yards & Docks, Navy Dpt., 18 St. and Constitution Ave. N.W., Wash. 25, D. C., 4 portal bases for cranes for concrete floating drydock, Puget Sound, NOY 12339, to Atlas Machine & Iron Works, Inc., 1252 Jefferson Davis Highway, Arlington, Va., **$69,980.**

†**Fla., St. Petersburg**—HYDRAULIC FILL —Yards & Docks, Navy Dpt., 18 St. and Constitution Ave. N.W., Wash. 25, D. C., placing hydraulic fill, St. Petersburg Airport, NOY 12388, to R. C. Huffman Constr. Co., P. O. Box 1347, **$67,407.**

†**Ia., Clinton** — OUTDOOR RECREATIONAL FACILITIES—U. S. Eng., 1709 Jackson St., Omaha 2, Neb., outdoor recreational facilities for convalescent soldiers, Shick General Hospital Cont. W-25-066-eng-748, to Central Engineering Co., 2531 Rockingham St., Davenport, **$57,118.**

†**Mass., Springfield** — RESURFACING TAXIWAYS—U. S. Eng., 31 St. James Ave., Boston, Zone 16, resurfacing cement taxiways at airport, Contr. 19-023-45-Neg-139, to M. DeMatteo Constr. Co., 200 Hancock St., Quincy, **$210,850.**

†**Md., Aberdeen Proving Ground**—TAXIWAY—U. S. Eng., Standard Oil Bldg., Baltimore, Zone 2, taxiways, at Phillips Field, Contr. W-18-020-eng-846, to George & Lynch, Delaware Trust Bldg., Wilmington, Del., **$26,560.**

UNCLASSIFIED (Contracts Awarded, Cont'd.)

†**Md., Patuxent River (br. Wash., D. C.)**—TAXIWAY, etc.—Yards & Docks, Navy Dpt., 18 St. and Constitution Ave. N.W., Wash. 25, D. C., taxiway and parking area, Webster Field, NOY 11987, to C. J. Langenfelder & Son, Box 5106, Highlandtown Station, Baltimore, **$229,897.**

Montana — GAS PIPELINE — Montana Dakota Utilities Co., Billings, 34 mi. 12 in. natural gas pipe line, Billings area, to W. A. Bechtel Co., 155 Sansome St., San Francisco 4, Calif., **$368,000.**

†**N. J., Metuchen**—DRAFT STOPS—U. S. Eng., 120 Wall St., New York 5, N. Y., draft stops in substructure of loading wharfs, to Spearin, Preston & Burrows, Inc., 50 Church St., New York 7, N. Y., **$29,320.**

†**N. J., Wildwood**—TAXIWAYS—Yards & Docks, Navy Dpt., 18 St. and Constitution Ave. N.W., Wash. 25, D. C., addnl. taxiways, Naval Air Station, NOY 8403, to Union Paving Co., 1227 N. Broad St., Phila. 22, Pa., **$58,000.** CD 4/26.

†**N. Y., Voorheesville**—SPRINKLER SYSTEM—U. S. Eng., 120 Wall St., New York 5, N. Y., sprinkler sys., to Ryan Plumbing & Heating Co., Inc., 156 Stone St., Watertown, **$224,633.**

†**N. C., Cherry Point**—RUNWAY LIGHTING—Yards & Docks, Navy Dpt., 18 St. and Constitution Ave. N.W., Wash. 25, D. C., installing permanent runway lighting, Marine Corp Auxiliary Air Stations, Oakgrove, N. C. and Congaree, S. C., and Atlantic Field, Cherry Point and Bogue, N. C., NOY 12182, to Webb Electric Co., Anderson, S. C., **$75,-164**; at Congaree, S. C., NOY 12551, to Boyle Constr. Co., Inc., Sumter, S. C., **$24,911**; at Bogue, NOY 12550, to Triangle Electric Co., New Bern, **$40,817.** Grand total $140,892. CD 5/15, under LB.

†**Pa., Phila.**—AUTOMATIC SPRINKLER SYSTEM—U. S. Eng., Standard Oil Bldg., Baltimore 2, Md., automatic sprinkler sys., Frankford Ordnance Depot, to Viking Sprinkler Co., 1701 Sedgley St., **$132,078.** Awarded 6/4. CD 2/6—ENR 2/8.

★†**Pa., Phila.**—AVIATION BLDGS.—Yards & Docks, Navy Dpt., 18 St. and Constitution Ave. N.W., Wash. 25, D. C., Storehouse R and L, with office space, 2nd floor bldg., incl. roads, tracks, etc., Naval Aviation Supply Depot, NOY 11933, to John McShain, Inc., 17th and Spring Garden Sts., **$1,639,200.** CD 5/29, under LB.

†**R. I., Newport**—FERRY SLIP REPAIRS—Yards & Docks, Navy Dpt., 18 St. and Constitution Ave. N.W., Wash. 25, D. C., major ferry slip repairs, Naval Training Station, NOY 12023, to Merritt-Chapman & Scott Corp., 17 Battery Pl., New York, N. Y. **$34,650.**

Texas — GAS TRANSMISSION LINE — Houston Natural Gas Corp., Petroleum Bldg., Houston, 50 mi. 12 in. natural gas transmission line between Corpus Christi and Alice, to J. W. France Co., Corpus Christi, approx. **$136,000.** Est. $175,000. CD 6/6.

Tex., El Paso—GAS PIPELINE—El Paso Natural Gas Co., El Paso, reconstructing, reconditioning several miles natural gas pipeline, own forces. **$25,000.**

†**Tex., Galveston** — DRYDOCK — Yards & Docks, Navy Dpt., 18 St. and Constitution Ave. N.W., Wash. 25, D. C., preparation of drydock, YFD-3, NOY 11666, to Todd Galveston Drydock, Inc., Pelican Dike, Galveston, **$150,000.**

†**Tex., Kelly Field**—AUTOMATIC SPRINKLER SYSTEM—U. S. Eng., Fort Sam Houston, automatic sprinkler sys., supplemental agreement, to Grinnell Co., 1315 Marilla St., Dallas, **$36,264.** Awarded 6/7.

★†**Wash., Seattle**—HANGAR—U. S. Eng., 1400 Textile Tower Bldg., Zone 1, 180 x 725 ft. experimental flight test hangar at Boeing Field, to Mowat-Sellen Co., 2833 Eastlake St., **$1,147,492.**

Wash., Seattle—ELECTRICAL CONDUITS—Seattle Transit System, Airport Way and Atlantic Sts., Zone 4, installing underground electrical conduits in 3 Ave. from James to Steward Sts., in Pike and Madison Sts., day labor, **$100,000.** CD 5/29—ENR 6/7.

†**Virginia**—SWIMMING POOL, etc.—U. S. Eng., Fort Norfolk, swiming pool, bath house and all appurtenent work, McGuire General Hospital, Contr. W-44-110-eng-479, to Conquest, Moncure & Dunn, Inc., 208 E. Cary St., Richmond, **$50,894.**

†**W. Va., Martinsburg** — OUTDOOR RECREATIONAL FACILITIES—U. S. Eng., 925 New Federal Bldg., Pittsburg, Pa., outdoor recreational facilities, Newton D. Baker General Hospital, near here, Contr W-36-038-eng-1361, to Moyer Brothers, Altoona, Pa., **$24,585.**

N. S., Halifax—SHED—National Harbours Bd., West Block, Ottawa, Ont., reconstructing Shed 21 at harbor, to Diamond Constr. Co., Ltd., Devon St. St., Fredericton, over **$250,000.** CD 5/3—ENR 5/10.

Que., Pointe-Au-Pere—WHARF—Dpt. P. Wks., Ottawa, Ont., wharf reconstruction, to Leandre Thibault, Matane, **$61,830.** CD 5/2.

Proposal Advertisement see p. 258 & 276
Postwar Projects see p. 198

ARMCO "Spiral Welded" is a versatile steel pipe. It has been used profitably in scores of applications—from water and gas lines to complicated industrial jobs requiring special prefabricated fittings.

It's easy to see why ARMCO Steel Pipe is in great demand. For one thing, its size-range is unusual. Diameters range from 6 to 36 inches, with wall thicknesses from 7/64 to ½ inch, in any lengths up to 50 feet. Special coatings are optional.

ARMCO Pipe is relatively light, but it is sturdy too. In foundation piles, for example, the tough spiral weld imparts extra lateral stiffness and high collapse resistance to even the longest lengths. When you need cone points, mill ends or cutting shoes, these can be mill-attached.

Uses include water, oil and gas lines; prefabricated pipe and fittings for special industrial layouts; foundation pipe, caissons and dredge pipe—in fact, wherever pipe can be used to advantage.

For your next piping job ask for prices and shipping dates on ARMCO Spiral Welded Steel Pipe. Just address Armco Drainage & Metal Products, Inc., Welded Pipe Sales Division, 2441 Curtis Street, Middletown, Ohio.

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ARMCO STEEL PIPE

THE MOST FOR THE MONEY — SPEED - EFFICIENCY - ECONOMY

CONSTRUCTION BY CONTRACT

THE ASSOCIATED GENERAL CONTRACTORS OF AMERICA, INC. · MUNSEY BLDG., WASH. D.C.

OFFICIAL PROPOSALS

Bids: June 25 (404)

Treatment Plant Equipment:

Informal bids will be received by the City Manager, City of DeLand, until 2:00 o'clock P.M., E.W.T., June 25, 1945, and then publicly opened and read, for furnishing the following equipment for proposed Emergency Sewage Treatment plant: .

3—Sewage Pumps
1—Primary Clarifier Mechanism
(For circular tank only)

Instructions to Bidders and complete specifications will be furnished upon request to City Manager, Box 449, DeLand, Florida. The right is reserved to reject any or all bids.

Edward M. Beardslee
City Manager.

Bids: June 29 (399)

Sewerage System and Appurtenances, etc.

BOROUGH OF FAIR LAWN
NEW JERSEY

Sealed Proposals, for the Construction of a Sewerage System and Appurtenances and Passaic River Crossings and Appurtenances, will be received by the Mayor and Council of the Borough of Fair Lawn, Bergen County, New Jersey, at the Municipal Building, Fair Lawn, New Jersey, at 8 P.M., Eastern War Time, on Friday, the 29th day of June, 1945, at which time they will be publicly opened and read. No bids will be accepted after said hour. Proposals will be received on the following contracts:

Contract I—Northwesterly Section
Contract II—Southwesterly Section
Contract III—Passaic River Crossings

Information for Bidders, Form of Proposal, Plans and Form of Contract including Specifications, may be examined at the offices of Thomas F. Bowe, Consulting Engineer, 110 William Street, New York City, New York, and at the office of the Borough Clerk, Municipal Building, Fair Lawn, New Jersey, between the hours of 10 A.M. and 4 P.M. daily except Saturdays and Sundays.

Copies of the plans and specifications may be obtained from either the offices of the Consulting Engineer or Borough Clerk, upon making a deposit of Twenty-five ($25.00) dollars, which amount will be refunded to the bidder who applies for a refund within thirty (30) days after the date when the bids are opened, and who returns the plans and specifications undamaged.

The Mayor and Council of Fair Lawn reserves the right to reject any or all bids, or to accept the bid or bids which in its judgment will be for the best interests of the Borough of Fair Lawn.

Cash, a certified check or bid bond made payable to the order of the Borough of Fair Lawn, New Jersey, in the amount of 5% of each contract bid must be deposited by each bidder with his bid as a guarantee that, in case the contract is awarded to him, he will, within ten days thereafter, execute such contract and furnish a satisfactory performance bond. The bidder shall also furnish a standard consent of surety. On failure to do so, he shall forfeit the deposit as liquidated damages and acceptance of the bid will be contingent upon fulfillment of this requirement of the bidder.

The successful bidder on each contract will be required to furnish a Performance Bond in statutory form and with sureties authorized to do business in New Jersey, which bond shall be in the amount of the contract.

MAYOR AND COUNCIL OF
THE BOROUGH OF
FAIR LAWN, NEW JERSEY
By: RALPH M. BRYANT
Borough Clerk

Dated, May 22, 1945
THOMAS F. BOWE
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(On page 276)

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